The Iron Age

A Review of the Hardware and Metal Trades.

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Isaac Lowthian Bell.

The gentleman whose portrait—the only one yet presented to the American public—graces this page of our issue, left this country yesterday for his home, after a brief visit of less than three months. He arrived here on the 22d of September, and, in company with Mr. Thomas Whitwell, made a hurried tour of inspection through the principal ore producing and iron manufacturing districts of the United States. The announcement of his coming was received with pleasure by all who are connected with the iron trades, and his departure will be regretted by all who have had the pleasure of making his acquaintance.

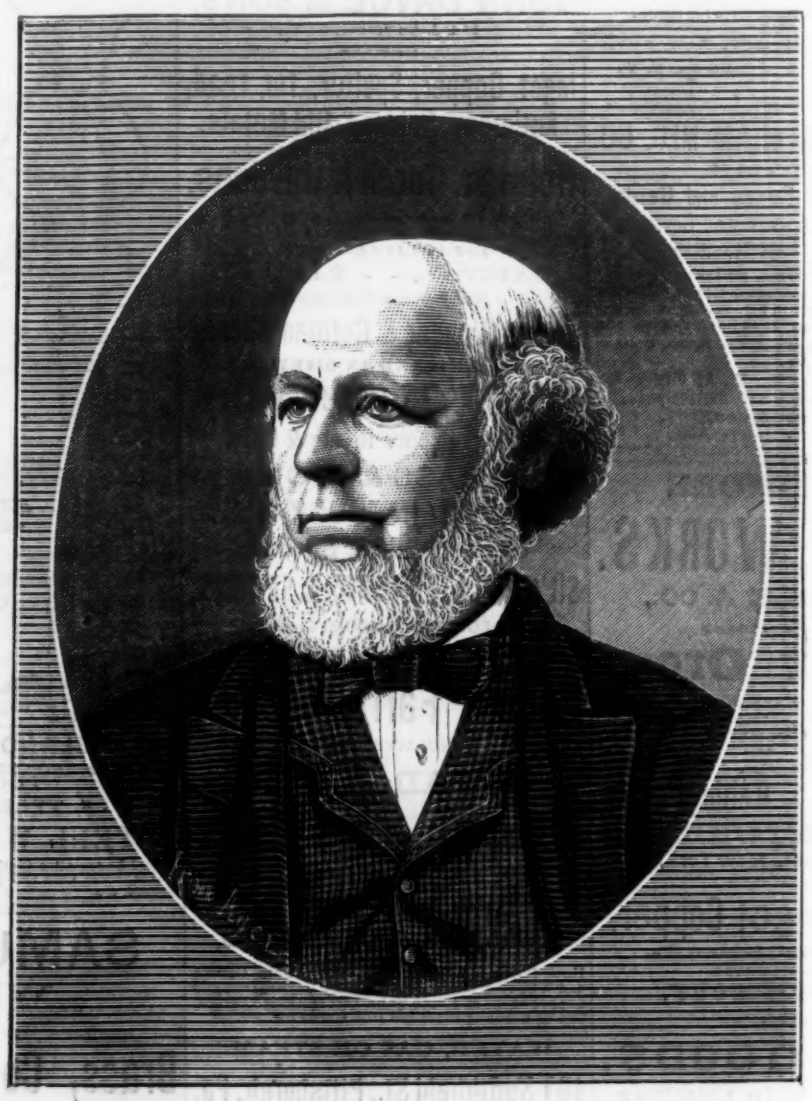
Mr. Bell is a member of the firm of Bell Brothers, of Middlesborough, England, and is one of the best known and most scientific iron masters of Great Britain. For many years he has given his attention to the intelligent study of the phenomena of the blast furnace, and his writings are contributions of permanent and exceptional value to the higher metallurgy of iron. In recognition of his distinguished services he was elected president of the Iron and Steel Institute of Great Britain, and entered upon the duties and honors of that office on the 28th of April, 1873. As president he had done much to strengthen the Institute, increase its influence, stimulate investigation and experiment, and encourage invention and improvement.

With no national or sectional prejudices to warp his judgment, he has ever manifested an intelligent knowledge and full appreciation of the resources of this country, and our readers who recall the several able addresses before the Institute, published in full in the columns of this journal, will remember with pleasure the manner in which he has urged the vast national wealth of this country upon the attention of British capitalists.

During his stay in this country, Mr. Bell has been the recipient of many courtesies, and we have the assurances from his own lips that he will carry home with him a pleasant remembrance of American hospitality. We are glad that this is so, but Mr. Bell came among friends which he had made for himself by his valuable and wholly unselfish labors in the cause of scientific iron manufacture. Personally he is a genial gentleman, a pleasant talker and an appreciative observer. We understand that he proposes to embody the impression of his visit to this country in a book, and if this intention is carried out we may expect a volume which will combine a just appreciation of our resources and enterprise with kindly and intelligent criticism. Mr. Bell has made many warm personal friends in this country, and will be heartily welcomed when he comes here in 1876 with the Iron and Steel Institute.

Sensible Views from a Railway President.

We take the following from the interesting speech of Mr. John W. Garrett, on the occasion of his re-election to the presidency of the Baltimore & Ohio Railroad Company: It is pleasant to reflect that the continued successful administration of the affairs of this company will not only accomplish the great good heretofore realized, but will help this great university to do those things which cannot fail to make our city illustrious in connection with the interests of education. It is very fortunate at a period when the evil results are shown of financial error—when many other railways, under the efforts of speculators and minipulators of stocks, committed the huge mistake of making not the reasonable and proper sum of capital, which just expenditures in construction create, but greatly enlarged and exaggerated bases, on which interest and dividends are expected to be paid—that the action of the Baltimore & Ohio Company furnishes a striking and distinct contrast to their policy. It is a marked fact that, beside the public interests to which I have referred, as proprietors, the descendants of many of the founders of the Baltimore & Ohio Railroad are still holders of its stock. It will be interesting to those who may not be aware of the fact to know that years since, when the progress of this company attracted the attention of speculators abroad and at home, foreign capitalists and capitalists of New York attempted to get a large ownership in its stock. Five dollars per share over the market price was then offered, and when five dollars did not tempt the holders, ten dollars a share over the market price, and finally fifteen dollars over the current market price was offered for large quantities of the stock of this company; but the stock was held by those who had no speculative objects—by those who had confidence in the future of the company, and who were interested in carrying out these great lines of policy, and especially in taking care of the interests of the city of Baltimore and of the state of Maryland, and contrary to the usage of Wall street and the money markets of the country, these sales were not made. The propositions were refused, and the result has been that this company has never been under the influence of foreign holders, and to-day it stands proudly alone as the only great railway corporation of the United States that consistently, persistently, and uniformly devotes its best energies and capacities to the development of the city and State and the territories with which it is connected. I, gentlemen, can but appreciate, and I do appreciate very highly, that you, representing these interests for which I have so long labored, the State of Maryland and the city of Baltimore and the stockholders of this company, have again, and for the seventeenth year, unanimously called me to this eminent position. I trust that the grand career of usefulness and effectiveness which has distinguished the Baltimore & Ohio Company will be maintained, that it will continue to build up our city, to add to the dignity and honor of our State, and to the wealth, power and resources of our common country."



ISAAC LOWTHIAN BELL.—(*From a Photograph by Kurtz*)

A New Method of Sheathing Ships.

The *Engineer* says: Whether for the iron-clads of the royal navy or for merchant ships, it cannot be doubted that an improvement upon copper sheathing, with a view to diminished cost in keeping in repair and other advantages, is an important desideratum. For iron-clads copper sheathing requires the addition to the exterior of the hull of from 6 in. to 8 in. of planking. This always involves several evils, and, amongst others, leakage, more or less; a greater amount of displacement, and, in consequence, the larger coal space for a given speed, without addition to the internal accommodation from the considerably larger external bulk. Beside, on tropical stations, iron fouls in about three months, and in any case ships of war need to be re-coppered every three or four years. Messrs. Westwood & Baillie, of Poplar, have designed a method of sheathing and the application of a material that seems fitted to obviate these evils, the essential feature of which is that below the water line they cover or plate the hull with Muntz's or other yellow metal that is quite as effectual an antidote or preventive of fouling as copper. The Muntz's metal plates would also constitute part of the strength of the ship. Half the thickness of the plating is of iron and the other half of yellow metal, which should be of sufficient thickness to admit of its bein caulked and made perfectly water-tight. If this is done it is believed that there will be no need for the employment of any non-conductor, other, perhaps, than a simple composition of, say, one gallon of black varnish mixed with 1½ lb. of common beeswax.

This system of construction would cost about the same in first cost as the ordinary mode of building composite vessels. The principal advantages of the proposed system, and these are of great importance, would be that the employment in the manner proposed of Muntz's metal would not only contribute to the strength of the ship, but would obviate the necessity, for a number of years, of docking and repairing ships constructed on the proposed principle, an important consideration for vessels on foreign stations. Galvanic action in the interior may be prevented, it has been ascertained, by the use of Messrs. Westwood & Baillie's cement. Leaks would be much more manageable and readily got at in this than in the ordinary mode of construction. The whole of the lower frames and plating could be of Muntz's metal, but this would, of course, considerably increase the cost. The invention appears to be worth the consideration of shipbuilders.

The Obstruction of the Steel Import Trade.—The Washington correspondent of the Boston *Journal* says: Several months since the Treasury Department instructed its special agent in Europe to visit the steel districts in England, and among other things to ascertain "what is the cause of the diversion of the steel import trade, by which nearly all imports have for some time past been entered at Boston, to be after entry shipped coastwise to New York, Philadelphia and elsewhere." The Treasury Department has just received the report of the agent, which contains the following reply: The cost of shipping steel to Boston is about five shillings per ton more than to New York, and the coastwise shipment is about ten shillings per ton further. The manufacturers say that they prefer to pay this rather than lose their time and have their trade impeded. They adopted this course for the following reasons: First, that they had less trouble with the Customs officials at the port of Boston than at New York, the prices being accepted at the former port as invoiced; second, that they were advised by their agents in the United States to incur the extra expense of freight to Boston and coastwise shipment to New York, and by legal counsel to ship in that manner.

Joinders in Suits to Repeal Patents.

The following letter of the Attorney General is of great interest to patentees and the legal profession, as it contains an announcement of the principles which will control the government in the matter of its joinder in suits to repeal patents:

DEPARTMENT OF JUSTICE,
WASHINGTON, D. C., November 19, 1874.

Sir: On the 6th instant an application was made to me by Messrs. Curtis & Corwine for leave to use my name in a suit upon the relation of George R. Fearing, Esq., to vacate a patent issued to B. F. Sturdevant, for a coil in ribbon of blank wood for the use of pegging machines. It was alleged as a ground for this application that there was a want of novelty in the said ribbon or coil. Accompanying this application were several affidavits to the effect that Sturdevant had recently raised the price of said blanks from twelve and a half to twenty cents each, and that a similar article was offered in the market for eight cents.

I was induced to think, upon the showing then made, that the leave asked for should be granted, and you were accordingly instructed to take the necessary steps for the commencement of the suit. Since then, application has been made to me by Messrs. Curtis and Corwine to amend the bill, and at the same time Mr. Sturdevant, with his counsel, Mr. Roberts, and others, claiming to represent the manufacturers of boots and shoes, asked to have the order made for the use of my name in said suit rescinded.

It is somewhat difficult to determine in what cases the Attorney General should allow his name to be used to set aside a patent as contemplated by the Supreme Court in the case of Mowry *vs.* Whitney, 14 Wall, 434. "The ancient mode," says the court in that case, "of doing this in the English courts was by *scire facias*, and three classes of cases are laid down in which this may be done.

1. When the King, by his letters patents, has, by different patents, granted the same thing to several persons, the first patentee shall have a *scire facias* to repeal the second.

2. When the King has granted a thing by false suggestion he may, by *scire facias*, repeal his own grant.

3. When he has granted that which by law he cannot grant, he *jure regis*, and, for the advancement of justice and right, may have a *scire facias* to repeal his own letters patent."

And the court further remarks that "If an individual finds himself injured, either specially or as a part of the general public, it is no hardship to require him to satisfy the Attorney General that the case is one in which the government ought to interfere, either directly by instituting the suit, or indirectly by authorizing the use of its name, by which the Attorney General would retain such control of the matter as would enable him to prevent oppression and abuse in the exercise of the right to prosecute such a suit."

When Sturdevant's patent was issued the question as to the novelty of the invention claimed by him was expressly decided by the Commissioner of Patents, and upon the reissue of the patent another decision of the same kind was made. I am now called upon by the *relators*, upon the allegation that there was no novelty in said invention, to proceed in the courts for the purpose of reversing these decisions.

To allow this would be practically to give an unsuccessful party objecting to a patent the right to appeal to the courts, and would seem also to put one department in the attitude of attacking the acts of another department of the government. Whenever it appears that the Commissioner of Patents has become satisfied that, through fraud or mistake, a patent has been improperly or illegally issued, the Attorney General, as a general rule, in my opinion, ought, upon the relation of "an individual who finds himself injured thereby," to allow a suit to be brought on behalf of the government to set aside such a patent. I do not mean to say, however, that the views or wishes of the Commissioner should be conclusive upon the Attorney General, but his action in such cases ought to look as well to the rights of the patentee as to the interests of those who seek its cancellation.

Taking a case like the one before me, in which the question is as to the novelty of the alleged invention, I have determined that where the Commissioner withholds his consent to a suit in the name of the Attorney General, to vacate a patent issued by him, such suit ought not to be brought until the validity of the patent in question has been denied, or at least gravely doubted in a judicial proceeding between private parties, as where the patentee sues some infringer of his alleged patent. Exceptions to this rule may be admitted where persons, alleging a want of novelty in a patent, infringe it, and the patentee delays suit with a view of allowing a large claim for damages to accrue, or where, with doubts as to the validity of his patent, there are special circumstances of injustice or oppression on the part of the patentee. But to preserve something like consistency in the action of the different branches of the Executive Department of the goverment, and to afford adequate protection to the discoveries and labors of inventors, it is necessary, in general, that the rule above stated should be observed. If the invalidity of a patent appears in a litigation about it between private parties, the Attorney General, upon a proper application, ought to interfere to prevent the patentee from harassing other persons with suits for the use of his pretended invention.

Where fraud is alleged as a ground of suit in the name of the Attorney General, to repeal a patent, nothing more than to satisfy him of the existence of the fraud is necessary to the application, as such a case cannot go upon the ground that the facts disclosed to the Attorney General were not presented to or passed upon by the Commissioner of Patents.

Mr. Sturdevant has given satisfactory reasons for advancing the price of his peg-wood blanks, and shows that it was by an arrangement with the manufacturers of boots and shoes, and for their benefit; and I am further satisfied that the public interests do not require me to take any steps to vacate his said patent. You will, therefore, withdraw the bill filed, and decline any further use of my name in this matter.

Very respectfully,
[Signed] GEO. H. WILLIAMS,
Attorney General.

GEORGE P. SANGER, ESQ.,
U. S. Attorney, Boston, Mass.

The Uniontown (Pa.) *Genius of Liberty* says: Last week Dunbar furnace was run entirely with native ores without the admixture of any mill cinder or foreign ores whatever, and the result was a first-class quality of "Red Short Iron," which has been the great desideratum with the furnaces in this region, inasmuch as the ores which produce it do away with the necessity of importing Lake Superior or other foreign ores. The furnace men here are of the opinion that they have now found just what they want, and that the best quality of iron can now be manufactured in this country at a price so far below what it costs to make it at any other point in the country, that the erection of one or two furnaces within four miles of Uniontown next summer is a foregone conclusion. Calculations have been made by several gentlemen practically acquainted with all the details of making iron, and of four of these estimates now before us, none of them put the cost above $12 per ton, while one puts it as low as $10. It will be seen by the following estimate, which allows the highest probable rate of labor and cost of raw material, that $12 per ton is a very safe basis at which to put the cost of a ton of metal:

Three tons ore at $2 per ton	$6·00
Seventy bushels coke at 3½c. per bushel	2·28
Three-fourths ton limestone at $1 per ton	·75
Labor	2·50
Total cost of one ton of metal	$11·53

There are several furnace sites near Uniontown where the cost of coke and limestone would be considerably less than the above estimate. Were furnaces erected on these sites, the ore, the coke and the limestone could all be brought to the very spot without a second handling, and upon a tramway of sufficient down grade to obviate the necessity of much horse-power. These facts and figures have already so strongly impressed themselves on the minds of a few of our enterprising men, that a company is likely to be organized during the winter which will commence the erection of a furnace as soon as the weather will permit next spring.

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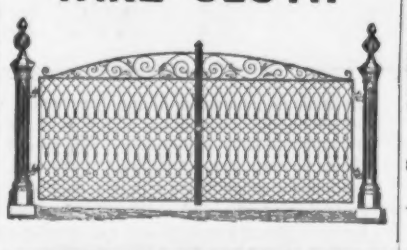

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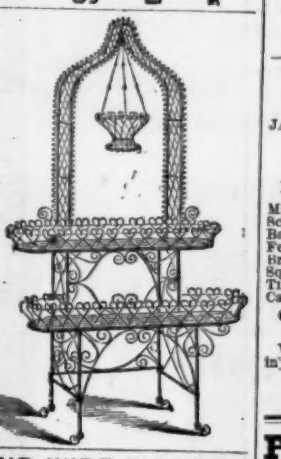

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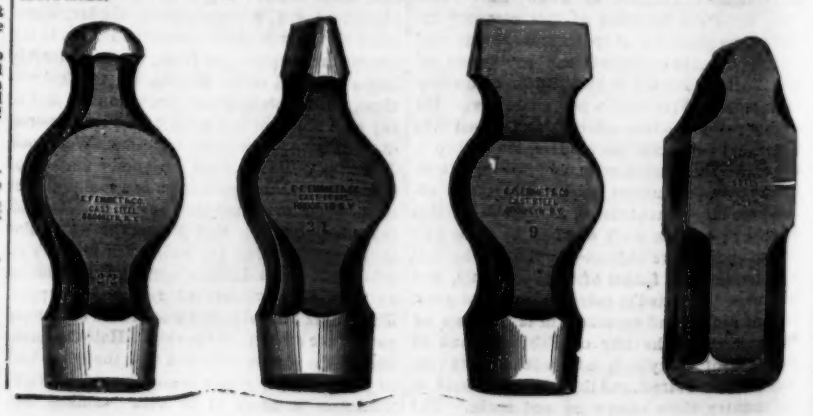

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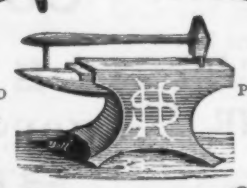

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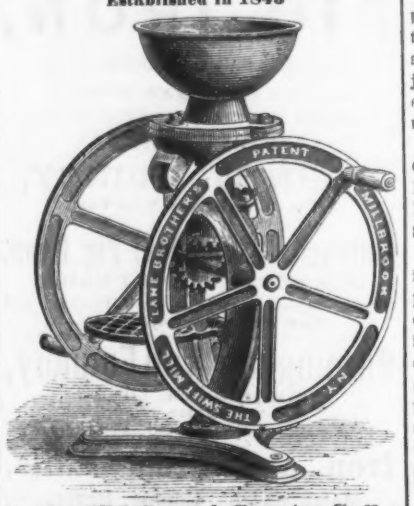

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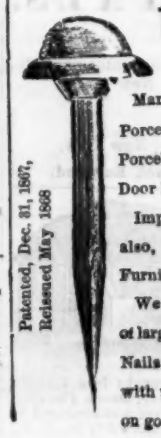

Patented, Dec. 31, 1867, Reissued May 1868

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Property in Patents Acquired by Assignment.

Mr. Edward E. Quimsby contributes to *Van Nostrand's Magazine* an article on the nature of property in patents, and the legal effect of the ordinary forms of assignment, which is of interest to so many of our readers that we reproduce it:

The ordinary form of assignment of an undivided interest in letters patent is as follows, to wit:

"In consideration of one thousand dollars to me paid by A. B., of———I do hereby sell and assign to the said A. B., one undivided fourth part of all my right, title and interest in and to the letters patent of the United States, No.—for an improvement in———granted to me ———the same to be held and enjoyed by the said A. B. to the full end of the term for which said letters patent are granted, and for the term of any extension thereof, as fully and entirely as the same would have been held and enjoyed by me if this assignment and sale had not been made.

"Witness my hand this——day of etc.

"C. D."

It is settled that the privilege conferred by a patent is an incorporeal chattel impressed with the character of personal estate by being made assignable, and also that joint patentees or joint owners of a patent, in the absence of special agreement, are tenants in common and not co-partners.

Hindmarch on Patents, Curtis on Patents, Clum *vs.* Brewer, 2 Curtis, 534; Parkhurst *vs.* Kinsman, 1 Blatchford, 496; Mather *vs.* Green, English Law Journal, vol. 35, p. 1; Vose *vs.* Singer, 4 Allen, Mass. R., 226.

An attempt to apply to tenancy in common in patents the rules of law defining the rights, powers and duties of tenants in common in other kinds of property meets with great, if not insuperable, difficulties, arising from the peculiar nature of the property in question. A patent right is peculiar in having a defined period of existence, during which it is indestructible—unlike cattle, it is not liable to the uncertainties of animal life, and, unlike vessels, it is not liable to shipwreck; neither can it be taken physical hold of and removed from the possession of its owner. Originally, as a rule, it has no ascertained money value. The theory of its existence is that it is *sui generis;* there is, therefore, no rule of comparison nor principle of measurement for determining its money value. It may be made valuable by the employment of capital and labor in a skillful use of the privilege which it confers, or, on the other hand, it may turn out to be worthless and involve a total loss of the capital and labor expended upon it, irrespective of the degree of skill exercised. A ship may be willfully burned, or a colt willfully killed by one tenant in common, in either case, who thus may totally destroy the common property. In such event the measure of damage to the other owners is easily ascertained, because, under similar circumstances, one ship has substantially the same value as another ship of like tonnage, materials and construction, and one colt the same value as another of like age, condition and strain of blood. But a patent right is a right to exclude all the world other than the grantees from the use of the privilege conferred by the patent, and there is no exclusion of any one of the grantees. One tenant in common cannot take away from his co-tenants their privilage without their consent. And exercise of the patent privilege by one tenant, instead of being a destruction of the common property, is usually a benefit to the other tenants by creating a demand for the thing patented, which they can take advantage of and participate in filling.

One of the elements of value in a patent right is its period of continuance. As the patent has a limited duration, the element of value suffers a conspicuous decrement from day to day. If the patent is commercially valuable, this value is at least discovered and established, if not created, by the act of exercising the patent privilege.

The ship may never have left the stocks, nor the colt its mother's milk, yet both ship and colt have an initial value, ascertainable by comparison, which may be regarded as so much capital representing the cost of building the ship or of breeding the colt. A patent right, on the contrary, derives its money value from a skilfull exploiture which results in profit. An unskillful exercise of the privilege may result in loss irrespective of the utility of the invention, and it is nowhere pretended mere co-ownership creates any liability on the part of one tenant in common to contribute any portion of such loss made by another tenant in common. Yet the prevailing notion is that each owner of an undivided interest in a patent is necessarily entitled to a corresponding share of all profits derived from the use of the patent. This would only be true if it were so expressly set forth and provided for in the assignment, or by agreement between the co-owners. It is obvious that in this and in various other ways the title to the patent may be kept in its entirety, the element of exclusiveness be presented and the patent administered for the joint account of the several owners pro rata.

The only thing in the foregoing form of assignment tending to support the theory that an accountability is created among the owners, is the use of a fraction to designate the measure of their several interests. It will not do to predicate upon this alone a contract, agreement, or condition *pro tanto*, that all the owners shall share *pro rata* in profits which may be realized by either one from the successful employment of his own exclusive capital and skill when they are concededly not liable to contribute if loss results from the unsuccessful employment of capital in the exercise of the patent privilege.

Public interest has dictated the establishment of special rules of law governing tenancy in common in certain cases, and it has been well said with reference to ship owners, that "a personal chattel vested in several distinct proprietors, cannot possibly be enjoyed advantageously by all without a common consent and agreement among them, and that the best method of forcing them to a common consent for their common benefit, is to leave it to themselves either to enjoy their common property by agreement, or to suffer it to remain unenjoyed or perish by their dissension."

The public interest in a patent right is not that the invention shall be locked up for the term of the patent, but that the patent privilege shall be exercised. The consideration for the grant is that something new and useful to the community has been disclosed by the grantee.

There appears to be an implied contract that the patent shall be exploited, and the public interest is clearly on the side of the part owner who either works the patent himself or licenses others to work it, and thus introduces the improvement into public use.

A patent has originally the character of a monopoly, and joint owners of it may, by agreement among themselves, preserve that character for it as against all the rest of the world; but it would be contrary to public policy to enforce such agreement when none such exists, it being to the interest of the public that there shall be competition among the owners tending to enlarge the production and reduce the cost of the thing patented.

In the absence of specific provision for perpetuating the monopoly, or, in other words, preserving the title to the patent in its entirety, it seems that assignees under the foregoing form are admitted by the grantee to the concurrent exercise of his patent privilege without liability to further payment or accountability therefor.

A privilege is a thing that a person has or has not; it is unsusceptible of division, and the privilege conferred by a patent is a mere naked right which would be inseparable from the person of the grantee but for the fact that every patent is by law assignable either as to the whole interest or any undivided part thereof. The fractional expression in the assignment determines the share of the respective owners in case of a sale of the entire interest by their consent, but no one owner can be compelled to consent to a sale nor be prevented from demanding any price he chooses for his interests, nor can his interest be sold and delivered without his consent. That is to say, each fractional interest is the subject of a distinct independent ownership. The property so shared was originally a right of the patentee to exclude all the rest of the world from the exercise of the patent privilege, *pro tanto* a right to remove the exclusion as to individuals, or in other words, to license others to use the thing patented. By the act of assigning a part interest, the patentee gives up the right to exclude the individual who becomes his assignee, and, of course, the power of granting exclusive license rights thereafter; because, any territoral license right granted by the patentee thenceforth is taken subject to the condition that the assignee may step in and concurrently exercise the privilege of the patent in the same territory. Neither the patentee nor his assignee as co-owners of the whole interest, can be compelled to concur in granting an exclusive territorial license right, nor be prevented from demanding and retaining what consideration they may choose as the price of their assent thereto. Nor is there anything to prevent the coincident exercise of the patent privilege either by the parties themselves or by their legal representatives. By a common agreement among themselves, they may preserve the exclusive character of the right, and continue its exercise as a monopoly, or, by their dissension, they may permit that element of the value of the patent to perish.

Bearing in mind that the patent privilege includes the right of licensing, the legal proposition may be thus stated:

Patent property consists of an assignable privilege, having originally an exclusive character, which may or may not be preserved at the pleasure of the grantee. If the grantee assigns an undivided part interest in his patent without the precaution of exacting an agreement regulating the use of the privilege assigned, he, by that act, divests himself of the sole power of exclusion which he theretofore possessed, and the common property thenceforth is simply a common privilege, the free exercise of which by either part owner cannot be held to be an invasion or infringement of the rights of the other part owner.

This state of things may be remedied and the rights of the parties preserved by a special agreement between them, or by a territorial division of the patent, or by assignment of the whole interest to a trustee empowered and directed to administer the patent for the account of the several owners, pro rata.

Manganese Pig Iron.—The company working the blast furnaces and forges of Marnaval have been producing for the past three months manganese pigs, which they employ with advantage for the replacement of charcoal iron, and with which they have notably improved the quality of their iron. These pigs are somewhat similar to those of St. Louis and Nassau, and are employed in the same way as a mixing iron in various quantities, according to the qualities required. Nearly all the production is used by the forge, except a few sample lots, which have been sold. The *Iron and Coal Trade Review* understands that the Society of Marnaval are preparing to light up another furnace for this manufacture, and that whatever excess there may be over their own consumption will be sent into the market. This addition of manganese to iron ores is not new in France, but the attempt has never, as yet, met with the success which should have attended it.

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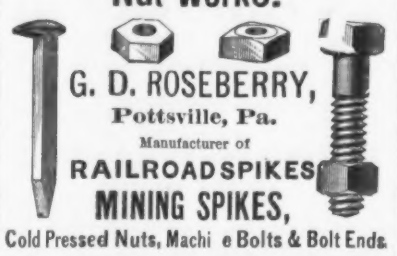

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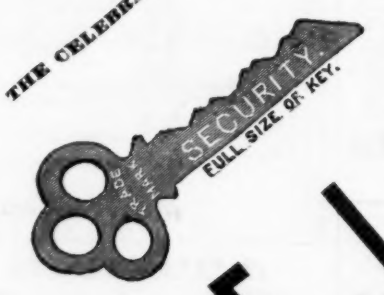

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The Furnace Owners' Meeting.

A Plan for the Limitation of Production in 1875.

A meeting of the pig iron makers of the United States was held in the rooms of the American Iron and Steel Association, Philadelphia, on the morning of the 10th instant, to consider the state of the trade and devise measures to promote its recovery from present depression. As was expected, the attendance was large, and the discussion was perfectly harmonious, although the resolutions were not unanimously adopted. Mr. C. J. Nourse, of Columbia, Pa., Chairman of the Pig Iron Branch of the Iron and Steel Association, called the meeting to order. The trade was represented by the following gentlemen:

Edwin Eldridge, Elmira (N. Y.), Iron and Steel Co.; W. H. Ainey, Lehigh Iron Company, Allentown; S. C. Baker, Allegheny Furnace, Altoona, Penn.; Edward Brooke, Birdsboro' Iron and Nails Works, Birdsboro', Penn.; Horace L. Brooke, Cedar Point Furnace, Baltimore, Md.; Orin C. Frost, Alpine Furnace, Watertown, N. Y.; T. Guilford Smith, Secretary Union Iron Company, Buffalo, N. Y.; B. S. Levan, Lehigh Valley Furnaces, Coplay, Penn.; J. J. Spearman, Spearman Iron Company; Allen F. Ormsby, Furnaces, Sharpsville, Penn.; H. S. Eckert, Henry Clay Furnaces, Reading, Penn.; D. J. Morrell, Cambria Iron Company, Johnstown, Penn.; C. S. Kauffman, Kauffman Furnace, Columbia, Penn.; James Hooven, Norristown Iron Works, Norristown, Penn.; C. J. Nourse, Chestnut Hill Furnaces, Columbia, Penn.; W. E. S. Baker, Irondale Furnaces, Bloomsburg, Penn.; G. W. Whitaker, President Saucon Iron Company; John Wister, Jr., Wister Furnace, Harrisburg, and Duncannon Iron Company, Duncannon, Penn.; J. B. Moorhead, Merwin and Elizabeth Furnaces, West Conshohocken; Ethelbert Watts, of Henry M. Watts & Sons, Marietta Furnace, Lancaster county, Penn.; Henry McCormick, McCormick & Co., Harrisburg; B. B. Thomas, Mathilda and Conestoga Furnaces, Howard Iron Works, and Thomas Coal Company; J. F. Cottrell, Donegal Furnace, Columbia, Penn.; George C. Reis, Rosena, Little Pet, Sophia, and Clara Furnaces, New Castle, Penn.; Benjamin Crowther, Isabella Furnace, Pittsburgh; Andrew Carnegie, Lucy Furnace, Pittsburgh; Z. S. Durfee, secretary Pneumatic Steel Association, New York; Samuel J. Reeves, president Phœnix Iron Company, Phœnixville, Penn.; Jerome L. Boyer, treasurer Temple Iron Company, Reading; Levi Rooke, Union Furnace, Lewisburg, Penn.; John Meily, Lebanon Valley Furnace, Lebanon, Penn.; Dennis Bauman, Carbon Iron Company, Parryville, Penn.; Charles B. Grubb, St. Charles Furnace, Lancaster, Penn.; Percival Roberts, Glamorgan Iron Company, Lewisburg, Penn.; W. H. H. Gere, Onondaga Iron Company, Geddes, N. Y.; Joseph D. Weeks, Graff, Bennett & Co., Pittsburgh; Peter Uhler, Uhler Iron Works, Easton, Penn.; D. K. Ferguson, president Vulcan Iron Works, St. Louis, Mo.; H. S. Chamberlin, vice president and manager Roane Iron Company, Chattanooga, Tenn.; John A. Rogers, J. & J. Rogers' Iron Company, Ausable Forks, N. Y.; J. B. Kunkel, Catochin Furnaces, Md.; John Marshall, Marshall Iron Company, Newport, Penn.

A committee consisting of Messrs. William H. Ainey, Allentown; C. S. Kauffman, Columbia; G. Whitaker, Hellertown; J. B. Moorehead, Conshohocken; G. Dawson Coleman, Lebanon; H. S. Eckert, Reading, and Horace Brooke, Baltimore, Md., was appointed at the meeting on Nov. 24, to urge upon manufacturers the importance of this gathering, and they submitted the following report, being the form of an agreement to be signed by the pig iron manufacturers of the United States, agreeing to curtail their production of pig iron to one-half of the capacity of their respective furnaces. The following is the substance of the report:

While it is more than probable that one-half or more than half the furnaces will be out of blast at the end of the year, whether the proposed agreement be made or not, the committee were nevertheless of the opinion, after free consideration, that the agreement would result in important benefit to the trade. The readiness and great anxiety of furnace owners to put their idle works in blast, will be, it is feared, a constant threat and danger to producers, consumers and dealers, that as soon as favorable reaction sets in enough of the hundreds of idle furnaces will be put in blast to again crush and destroy the market, unless controlled in the manner proposed. It is confidently believed that the mere knowledge of this action will impart confidence and tone to all the various branches of the iron trade. We may, however, be permitted to suggest to the meeting, and through it to the trade at large, that there is nothing which we can see to warrant the hope of any early marked improvement in the iron trade. Reaction, in the belief of the committee, must be slow and gradual when it sets in, which is not yet. The great depression is not in iron alone, it is general. Nearly all manufacturing industries are similarly affected, though the iron trade has suffered most. Manufacturers are everywhere prepared to produce much more than there is a present market for. The consequence has been a large curtailment of production, and, with many, an entire suspension of operations. Add to this that there are many railroads in the South and West which are not earning expenses, from the large falling off of freight and passenger patronage, thus cutting off their ability to purchase iron for repairs, and in many cases have failed to pay the interest on their bonded indebtedness, and that all other railroads and all branches of business have been more or less affected in the same way, we are unable, therefore, for these and other obvious reasons, to see any reasonable ground upon which to base the hope of an early recovery. The following is the form of the agreement we submit for your consideration:

"The undersigned pig iron manufacturers, believing that the greatly decreased demand in the consumption of pig iron imperatively demands a corresponding decrease in the amount produced; and believing, also, that through overproduction a crisis now exists in the pig iron business which requires prompt and energetic action to save it from threatened bankruptcy and ruin; and believing, also, the proper and most effective remedy is to be found in a decrease of production to correspond with the demand for consumption, we, the undersigned furnace owners, in person and by their representatives, hereby agree, each with the other, that we will severally decrease the production at our respective works to a quantity not exceeding one-half the capacity of our several furnaces; and to faithfully continue and maintain such decrease of production for and during the whole of the year 1875, provided that this agreement shall not be binding until signed by the representatives of at least two-thirds of the furnaces, exclusive of charcoal, in the United States; and provided, further, that signers to this agreement may withdraw and be released from the same on giving two months' written notice to the secretary of the American Iron and Steel Association of their desire and intention to do so."

Mr. Ainey supported the report in a few forcible remarks, and urged that an effort be made to secure all the signatures possible. He thought the movement, being one of self protection, would meet with the approval of the public.

Mr. B. B. Thomas urged the necessity of immediate relief, and declared that the action contemplated by the report would be too slow in its operations.

Mr. Henry McCormick, of Harrisburg, was then invited to take the chair, and Mr. Nourse was requested to state his views. He said of the report, although it was definitely to the point, he believed the matter was certain to settle itself, without the formation of any combination among the manufacturers. He thought any kind of a union was undesirable and unwise, and was always looked upon with disfavor by the public. It would be more advantageous to state the general cost of pig iron and circumstances proving it, and to inform the makers of pig iron in every section of the extent of the losses they are all liable to suffer. Again, there are too many contending interests to effect an arrangement which will be generally agreeable, and he therefore substituted the following report for that of the committee, which he calculated would be, under the circumstances, more judicious:

Resolved, That it is the sense of this meeting that any combination or agreement to limit the production of any article in general use by the public is unwise; the better course is to circulate as widely as possible, correct statements of the market prices that can be obtained, the amount of production, probable demand, and the stocks on hand, leaving producers to their own judgment whether it is their interest to suspend or continue production. With about one-half of all the furnaces of the country now out of blast, and the demand so limited for the product of those yet in blast that "gray forge" pig iron is quoted in this market to-day at very low figures, in our opinion, the pig iron manufacturers need no advice or agreement as to suspending for a while further production.

Mr. Kauffman expressed his views, stating that a total suspension of production ought to be resolved upon.

Mr. Ainey thought the matter a difficult one to master. Two-thirds of the anthracite furnaces are in blast to-day, and for what reason? Some hope the reaction will be sudden, and then the expense of blowing out and in will be avoided, while others hope their neighbors will be induced to go out of blast and thus leave them the trade.

Dr. Eldridge favored the report of the committee, and said that he had two furnaces, one of which, thought built two years ago, had never yet been put in blast, and would not until the market greatly improved.

Mr. B. B. Thomas opposed the substitute and favored the adoption of the report of the committee. He showed how the coal producers had placed their business on a firm foundation through the organization of the producers, and argued in favor of a similar organization of the iron men. The question on the substitute was then put and the motion lost, after which the report of the committee was adopted.

The following resolutions were introduced by Col. Kauffman, of Lancaster, and adopted with some opposition:

Resolved, That in our judgment it would be disastrous to the manufacturing and commercial interests of the country to attempt the resumption of specie payments in the near future, and that if attempted would only be a failure.

Resolved, That the only way to resume is to get the business of the country in such condition, by the regulating of the tariff on imports, as will keep the balance of trade in our favor, and by that means keep our specie from going out of the country.

Resolved, That we heartily approve of the 3·65 bill of Judge Kelley, and ask our Representatives in Congress to use all honorable means for its passage.

Several members deprecated the discussion of this question, but a majority of those in attendance believed that it would be beneficial.

The reciprocity treaty received consideration, and the following resolution was introduced by Mr. Whittaker, of Hellertown, Penn.:

Resolved, That this convention, representing the pig iron manufacturers of this country, earnestly protest against the ratification of the proposed reciprocity treaty with Canada, believing that such treaty, if ratified, would result in completely breaking down the barriers which now exist against the introduction to our markets of the products of low priced European labor; in disastrously impairing the revenues of the government; in preventing the payment of the interest on our national debt, and in continuing indefinitely the general distress which now prevails.

Mr. Ainey moved that an executive committee of five be appointed to carry out the plan of curtailing production. Adopted.

The committee is as follows:

Messrs. William H. Ainey, Allentown; J. B. Moorhead, Philadelphia; W. H. H. Gere Geddes, New York; James I. Bennett, of Pittsburgh, and H. L. Brooke, of Baltimore.

Mr. Edward Samuel, of Philadelphia, read a paper upon the English plan of storing pig iron at producing centers, instead of allowing it to accumulate at seaports, which was listened to with attention, and was generally looked upon favorably. The meeting then adjourned.

Capt. E. B. Ward, of Detroit, is mentioned as the probable successor of Senator Chandler in the U. S. Senate. Michigan could find no man who would more truly represent her own industries and those of the whole West, nor one who has done more to promote the growth of and development of that section.

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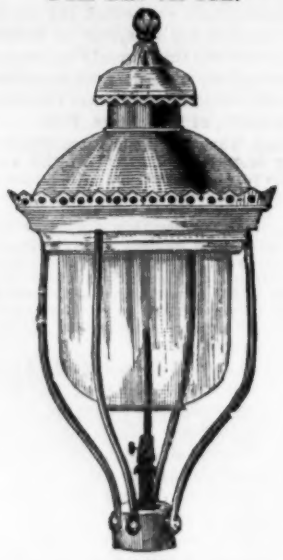

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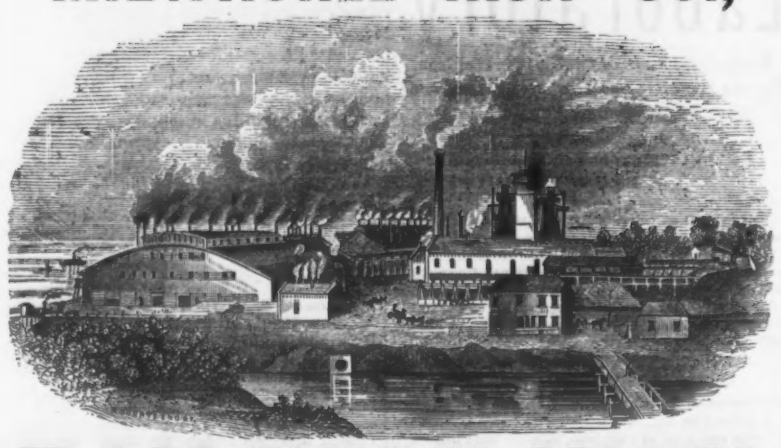

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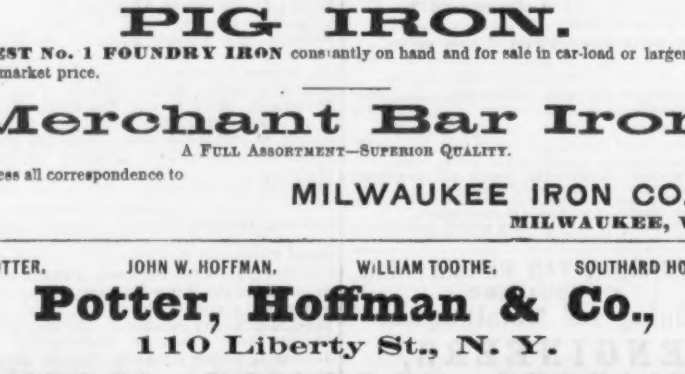

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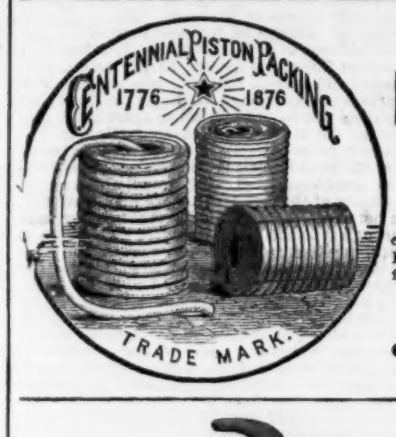

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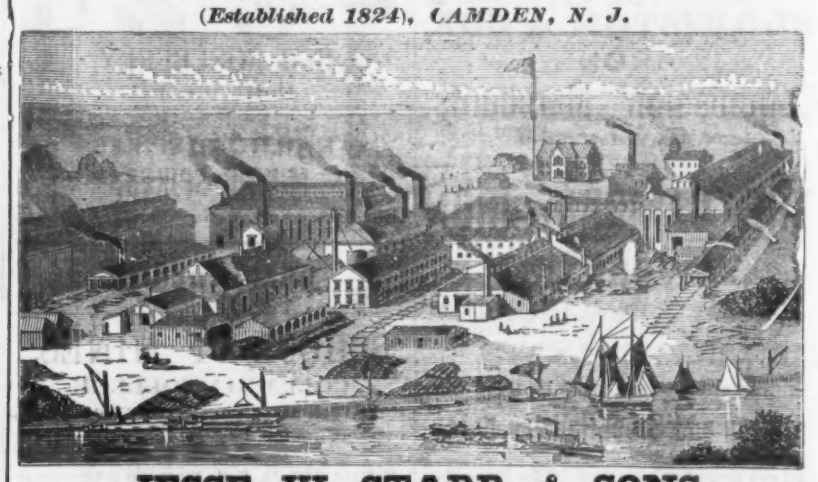

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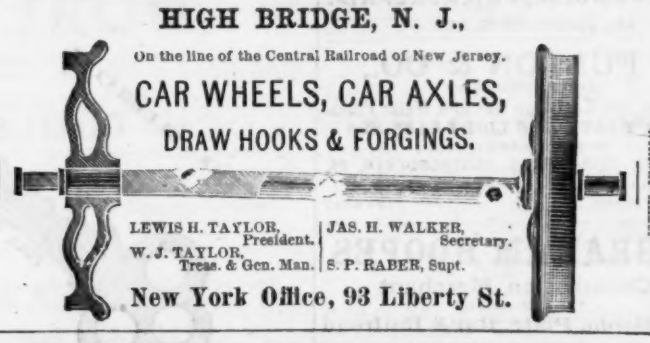

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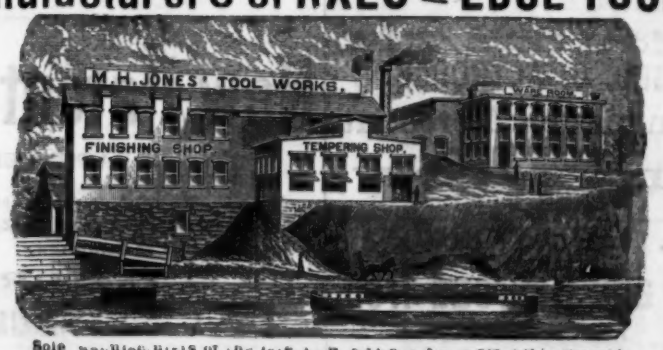

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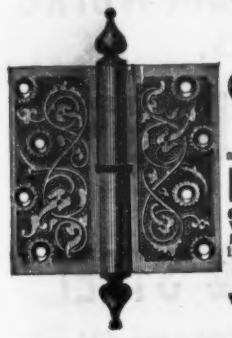

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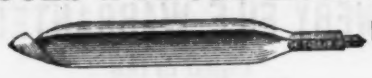

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Manufacturers of

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Stand Sad Irons, Polishing Irons, Toilet Irons, Towel Racks, &c.

Theories of Steam Boiler Explosions.

BY DR. FERDINAND FISHER.

[Concluded.]

6. *Sudden Relief of Pressure.* Parkes brings out the important fact, that of 23 boiler explosions investigated by him, 19 took place at the time of starting the machinery; others of these boilers exploded when the safety valve was opened. The experiments upon boiler explosions which were undertaken under the direction of the Treasury Department of the United States, by a commission of the Franklin Institute of the State of Pennsylvania, have shown that, when an opening is made into a boiler, there takes place at the point where the steam escapes, first a local foaming; and that then this foaming extends itself rapidly over the entire surface of the water in the boiler. This foaming is the more violent, the larger the opening into the boiler. The small experimental boiler used by the commission, by opening the safety valve—which was situated at about its center—was so completely filled with foam that the water was ejected from it with great violence. To the same effect are the remarkable experiments of the Society of Engineers of Breslau. A manufacturer of Bordeaux explains the explosion of the steamboat Cito on the supposition that, when the throttle was opened, the hitherto quiet production of steam changed into a tumultuous boiling, the foaming, muddy water obstructed the exit passage—the valve being constructed for the escape of steam, not for muddy water—and the boiler could not withstand the increased tension thus produced.

Reiche, on the other hand, is of opinion that by the sudden opening of the throttle, by the collapsing of a flue, and the like, a violent foaming takes place, so that not only steam but a large quantity of water is discharged, also, thus emptying the boiler and lessening the pressure upon it. The boiler explodes, according to this theory, from a deficiency of water; but how, is, unfortunately, not stated.

If the steam tension in the boiler be suddenly lessened, in consequence either of cooling by the entrance of water, of opening the throttle, of collapsing a flue, etc., a violent evolution of steam takes place, by which, under certain conditions, the water of the boiler is hurled with such force against its walls that they cannot resist the blow. This theory, first suggested by Colburn, is sustained by Bergius, Hoffman, Werner and Kurz. Grashof, especially, has proved that in consequence of this sudden evolution of steam following the superheating of the water, an actual explosion of the boiler may result. A gradually increasing pressure, as already mentioned, has only the effect of widening little by little some crack in the most defective part of the boiler; a sudden, explosive increase of pressure, on the other hand, may produce an instantaneous explosion of the boiler at many places at once. The water being suddenly reduced to simple atmospheric pressure, evolves an enormous amount of steam, which, at the instant of its formation, has the pressure corresponding to the temperature of the water from which it was formed; the heat stored up in the water is transformed into work, and thus causes the destruction. A fracture of the boiler somewhere may therefore be the occasion of its explosion.

Kayser gives it as his opinion that the masses of steam which become free, almost explosively, as it were, by the sudden relief of pressure, may give so violent a blow on the boiler walls that these give way under the strain. While Grothe and Kirchweger call in question the possibility of such a sudden evolution of steam, and Cohn declares that he has observed that no noticeable shock takes place on the sudden relief of pressure, Giesberg, Jacobi, Heinemann, Weikner, and others, accept, essentially, the theory of Kayser.

Ludewig shows that the theory of Dufour in no way conflicts with that of Kayser, but that each supplements, rather, the other. While, according to Dufour, the opening of a safety valve, etc., is only the mediate cause of the explosion, according to Kayser the explosion takes place on opening the valve, directly in consequence of the diminished pressure. To similar purpose are the statements of Hrabak and Schroder.

7. *Shocks to the Boiler.* Schafhautl, in his experiments, filled some glass tubes, about five centimeters long, one-fourth with water, sealed them and plunged them into molten zinc whose fusing point is 412° C. They sustained well the enormous pressure of nearly 400 atmospheres, but exploded with great violence when touched with an iron bar vibrating longitudinally. He believes that no explosion is ever caused by excessive tension of steam alone, but that an explosion may take place from a vibratory motion of the boiler walls; indeed, that such explosions have already happened, caused, for example, from the blow of a hammer, or even from throwing a small stone against the boiler. Similar experiments have been made by Gensoul.

That such a shock is competent, alone, to tear a boiler in pieces, is very doubtful; but, in conjunction with the causes mentioned under 1 and 5, it may have its effect in causing the destruction of a steam generator.

8. *Overheated Plates.* It is remarkable that, even at the present day, the heat necessary for the work of explosion is so often sought for, not in the water contained in the boiler, but in the overheated boiler plates. Such an overheating may take place, but can only arise either from want of water, from the formation of incrustations, or from deposits of sediment.

Deficiency of Water. According to Carle and to statements from other sources, if the water sinks below the fire-line, that portion of the fire surface of the boiler which is no longer wet, becomes red-hot. If now the boiler be fed, or in the case of a ship's boiler, if the ship roll to one side, or if in any other way water comes in contact with the red hot plates, so much steam is suddenly produced that an explosion is unavoidable.

Moreover, the experiments of the commission of the Franklin Institute have shown that by injecting water into a red hot experimental boiler, a high pressure may be generated in a very short time; but Tassin, on the other hand, reached no other result on pumping water into a red-hot steam boiler, than to spoil the boiler.

More recent experiments with a red-hot boiler prove that at the injection of the feed-water, the overheated iron strongly contracts, and this causes the boiler to leak around the rivet holes. The experiments of Fletcher, as well as those made by the Pennsylvania Railroad Company, are to the same effect, and go to show that the explosion of an overheated boiler, by the sudden injection of feed-water, is not even possible. Observations similar to these have been made by Oechelhauser and by Bocking.

The assertion that the steam, superheated by the red-hot boiler plates, is transformed by the water fed into the boiler, into saturated steam of so much higher tension that an explosion results, has already been disproved by the experiments made by the Franklin Institute.

Perkins maintains that, with a low stage of water in the boiler, the steam may become so strongly superheated, that not only the upper portion of the boiler, but even the part situated beneath the water, may become red-hot (?). On opening a valve anywhere, the water takes up this heat, forming instantaneously so much steam that the boiler cannot withstand the pressure. Marestier and Loyer are of the same opinion. Not more happy is the hypothesis of Sawyer that the level of the water in a steam boiler changes in consequence of the unequal pressure upon its surface; and that in this way a portion of the boiler surface is laid bare and overheated, and so gives rise to an explosion.

Incrustations and Deposits of Sediment. That boiler plates which are covered with thick incrustations may become red-hot, has long been known. Now if these deposits, resting on red-hot plates, be suddenly raised, an explosion may take place, due to the violent evolution of steam. Couste has even asserted that when we are able to prevent the formation of incrustations in boilers there will be no more boiler explosions.

Williams concludes from his experiments that crystalline solid incrustations are less dangerous than porous ones, formed by the solidifying of the sediment, since they conduct the heat far better. Peschka also regards the deposits of sediment as more dangerous than the solid incrustations.

Although it is very doubtful if the steam formed by the rising up of a deposit can alone cause the explosion of a boiler, yet it is quite possible that the plate thus suddenly cooled may become fractured. Moreover, the indirect dangers arising from the fact that red-hot iron has far less strength than that which has not been overheated, and that the plates may burn out and be used up still more quickly than would be the case without a failure of water or the formation of an incrustation, is not to be overlooked.

According to the experiments of the Franklin Institute Commision, an iron plate retains when heated red-hot only one-sixth of its original resistance; yet, theoretically, the tenacity of iron ought to reach its maximum at a temperature higher than the usual temperature of steam. So also, according to Wertheim, many metals, and particularly iron, possess a maximum of elasticity at mean temperatures. Other authorities, on the contrary, state that iron at 300° C. is 16 per cent. stronger than when cold.

According to Kupfer, the diminution of elasticity for each degree centigrade is expressed, in parts of the whole, as follows:

For Iron	0·00055
For Copper	0·00082
For Brass	0·00089

Especially noteworthy, however, are the recent investigations of Kohlrausch and Loomis. If the modulus of elasticity at 0° C. be indicated by E^0, then at the temperature τ it is:

For Iron.....$E = E^0(1 - 0{\cdot}000447\tau - 0{\cdot}00000012\tau^2)$
For Copper...$E = E^0(1 - 0{\cdot}000520\tau - 0{\cdot}00000028\tau^2)$
For Brass....$E = E^0(1 - 0{\cdot}000428\tau - 0{\cdot}00000136\tau^2)$

If the definition of modulus of elasticity be referred, not to the unit of length, but to the transverse section, the factors of τ in the case of iron, change to 0·000483, in that of copper to 0·000572, and in that of brass to 0·000485. According to this, the elasticity diminishes by an increase of temperature from 0° to 100° C:

For Iron	from 4·6 to 5·0 per cent.
For Copper	from 5·5 to 6·0 per cent.
For Brass	from 5·6 to 6·2 per cent.

The second column of numbers here given refer to the second definition of the modulus of elasticity. Hence the statement that these metals possess a maximum of elasticity at mean temperatures is not correct.

Moreover, the later American experiments on steam boiler explosions have shown that the power of resistance of a boiler plate against steam pressure is quite notably diminished by heating it.

Overheating of the boiler plates, therefore, diminishes still more the still remaining tenacity of the metal. Indeed, according to the experiments of a committee appointed for the purpose, the tenacity of overheated iron amounts to only two-thirds of that originally present. The rivets diminish its strength in like manner, about one-third; so that boiler iron ought never to be subjected to any greater pressure than one fifth part of its normal strength. Schafhautl has observed that a boiler which at first worked well under a pressure of twenty atmospheres pressure, after it had been overheated by allowing the water in it to get low, exploded under a pressure of twelve atmospheres. The overheated iron, too, had become strongly contaminated with sulphur. Indeed, the danger that the iron will take up sulphur from a pyritiferous coal increases materially at high temperatures.

Ward has made some observations on the temperature of two boilers. He found below the water line temperatures varying from 131·6 to 135·5, and in the steam space, from 201° to 260° (evidently in consequence of radiation from the boiler walls). The water surface oscillated up and down about fifteen centimeters, so that at some points within the boiler a sudden variation of temperature of 128° took place. That such differences of temperature as this, and consequently, also, the strains produced by the various amounts of expansion of the different parts of the boiler, may be materially increased by overheating the plates, needs no formal statement.

Heated boilers, under otherwise similar conditions, explode far more easily than when the same pressure is applied to them cold. A boiler exploded not long ago under a pressure of only three atmospheres which had been previously tested by cold hydraulic pressure up to nine atmospheres. The cold pressure test is therefore regarded in many quarters as completely worthless.

In conclusion, if we take into consideration the great loss of fuel occasioned by boiler incrustations—according to Couste, 40 per cent.—as well as the important fact that muddy and impure water foams strongly, stops up the water gauges and the manometer, and that the sediment itself is even carried over into the engine, there is ground enough for the opinion that the formation of incrustations and boiler deposits is the worst enemy of steam industry.

The Iron Movement at St. Louis.

The *Railway Register* presents the following statistics of the iron movement at St. Louis for two years:

RECEIPTS OF IRON ORE AT ST. LOUIS.

Month.	1873. Tons.	1874. Tons.
January	30,330	6,135
February	31,750	6,715
March	32,685	14,365
April	54,652	23,280
May	39,280	29,823
June	34,365	21,980
July	34,515	17,140
August	35,480	15,835
September	25,345	13,220
October	15,780	8,099
November	9,590	4,615
December (estimated for 1874)	5,585	5,000
Total	349,357	166,200
Decrease in 1874, 183,157 tons.		

SHIPMENTS OF IRON ORE FROM ST. LOUIS.

Month.	1873. Tons.	1874. Tons.
January	2,274	3,063
February	16,076	8,849
March	27,034	23,019
April	28,435	22,770
May	27,692	20,905
June	17,685	8,691
July	15,270	7,055
August	13,473	5,910
September	10,092	1,400
October	10,223	2,515
November	5,460	2,223
December (estimated for 1874)	3,330	2,000
Total	179,099	108,400
Decrease in 1874, 70,679 tons.		

PIG IRON.

	1873. Tons.	1874. Tons.
Receipts—To November 1	56,931	42,688
To December 31	61,088	....
Exports—To November 1	53,550	33,148
To December 31	57,571	....

The last of the six iron steam colliers, built by Cramp for the Reading R. R. Co., has made a successful trial trip. She is named the Pottsville. Like the others, she is fifteen hundred tons burden, two hundred and fifty feet long, twenty-seven feet beam and twenty feet depth of hold. These steamers have thus far given entire satisfaction to the company, and the arrangement, therefore, is a permanent one. It is intended chiefly to operate in the carriage of coal from the company's wharves at Richmond to the company's great coal depots in New England and elsewhere, whereby the corporation will always be able to regulate its business without reference to the ruling rates of freight on coal by water. But as the number of sailing vessels belonging to this port, engaged in the coal trade, is very large, considerable interest has been excited to know what is to be the future of that fleet, the amount of capital invested therein being very considerable. It is also to be observed that the new through railroad route of the Pennsylvania Company to Boston, via Poughkeepsie, looks to the carriage of coal by rail.

The new German process of freeing cast iron of phosphorus is represented as yielding superior bar iron from phosphureted cast iron at practically no increase of cost. The method is very simple. Chloride of calcium and common salt, fused together in about equal proportions, are intimately mixed with the molten iron in the puddling furnace, either by adding gradually in two-pound water-tight paper packages, or placing the whole quantity required upon the bed of the puddling furnace at first, and, in either case, very thoroughly working it with iron. The puddling process is generally so much shortened that the consequent diminution of the waste of iron almost affects the cost of the material added. The quantity of the mixed chlorides required is about three times that of the phosphorus present in the cast iron. The presence of other chlorides, as of manganese, iron and magnesium, interferes with the process, and renders a large excess of chloride of calcium necessary.

The Scranton *Free Press*, in speaking of the lawlessness that reigns in that section, says the true state of society there is "lawless beyond precedent, desperate beyond measure, and murderous beyond imagination," and asks who of the perpetrators of the twenty-three murders committed in Luzerne county within the last three and a half years, have been punished?

A reduction in freight rates on pig iron and muck bar has been made by the Pennsylvania Railroad, from Harrisburg and the Susquehanna Valley to Pittsburgh, from seventeen and a half cents per cwt. to eleven cents. This is the lowest rate ever charged for this class of freights.

Reasons for Using our Goods.

Hogs when ringed are prevented from rooting, and fatten quickly.

Pastures and clover fields are kept smooth and are not destroyed by the hogs rooting them up.

Feed lots in the winter are kept smooth, and corn that is otherwise rooted and tramped into the ground is saved.

The **Triangular Wire Ring, manufactured only by us,** is the only wire ring that can be inserted in the hog's nose with one grip on the **Ringer,** and is the only ring that will remain in a hog's nose, as it fits close, will not turn in for the joint to irritate the nose, is not liable to be torn out, and heals quickly.

No puncturing of the nose required to insert our ring.

For Sale by the Leading Jobbing Hardware Houses of New York, Philadelphia, Baltimore, Cleveland, Columbus, Cincinnati, Dayton, Indianapolis, Lafayette, Chicago, Milwaukee, Burlington, Davenport, St. Louis and San Francisco.

SOMETHING NEW.

We shall this present season make a **Heavy Tinned Wire Ring** that will not rust in the hog's nose. The strongest and best ring in the market.

Prices.

Ringers, retail	$1 00
" per doz	6 00
Rings per box (100) coppered wire	50
" per doz boxes (1200) "	3 00
" per box (100) tinned wire	60
" per doz. boxes (1200) tinned wire	4 00
Tongs or Holders retail	1 25
" " per doz	9 00

The coppered wire ring will be sent unless otherwise ordered.

Samples by mail postpaid on receipt of retail price.

Goods sent C. O. D. with privilege of examination before paying charges.

Net prices in quantities, circulars and posters mailed free.

Our advertisements are now inserted in over 1800 newspapers, published in every State of the Union, so that dealers will find a large demand created for our goods.

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All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand or upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

USE THE BEST.

Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

FILES AND RASPS.

XTRA QUALITY,
MADE FROM THE BEST
IMPORTED STEEL
BY THE
Auburn File Works,
AUBURN, N. Y.

JOHN ROTHERY'S Celebrated Hand-Cut FILES,

Made of Best English Cast Steel.

WALSH, COULTER & FLAGLER, Sole Agents,
83 Chambers and 65 Reade Streets, N. Y.

W. F. SHATTUCK & CO.,

113 Chambers and 95 Reade Street, New York.

MANUFACTURERS OF AMERICAN HARDWARE.

Coes & Taft's Pat. Wrenches.
Axe, Pick, Sledge & Hammer Handles.
Hatchet, Auger, Chisel & File Handles.
Mallets. Pat. Boot Jacks.
Gimlets and Gimlet Bits.
Augers and Auger Bits.
Cocoa Nut Dippers.
Mouse Traps. Wire Seives.
Scale Beams.
Patent Tap Borers.
Tool Chests.
Climax Horse Collars.
Brandage Horse Nails.
Maguire's W'r'l Iron Goods.
Shattuck's Platform Counter Scales.
Yaw's Cow Bells.
Axes, Picks and Hatchets.
Hammers. Crow Bars.
Sad Irons.
Boring Machines.
Cast Iron Hatchets.
Coffee Mills.
Star Steel Spoons.
Stocks and Dies.

DEAN'S New Patent (1873)
Screening Scoop SHOVEL

For Coal, Coke and Coal Ashes, and other Substances.

The largest frames are 12 by 18 inches, with seven bars, and are made of the Best Malleable Iron. They are, or can be, wired between bars by an arrangement of holes a quarter of an inch apart, by an ordinary person, to screen any size substance desired. They are warranted to be the most durable and practical Screening Shovel made, or money refunded.

Reference—All New York Gas Companies and Hotels.

☞ Smaller sizes on hand. Please address orders to

A. SEE & SON,
N. Y. Shovel Works,
1358 Broadway, N. Y.

Price: Largest size $30 per doz., and upwards, according to size of spaces.

Clement & Hawkes Mfg. Co.,
Manufacturers of
SHOVELS,
Planters' Hoes, Trowels and Machinery.
Northampton, Mass.
☞ Send for Circular and Price List.

Schweitzer Mfg. Co.,
57 Reade St., N. Y.
IMPORTERS & JOBBERS.

Established 1816.

Peter A. Frasse & Co.,

95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
SHEFFIELD.

FILES AND HORSE RASPS,

And Importers of

P. S. STUBS' FILES, TOOLS & STEEL,
W. J. Davies' Sons' London Emery Cloth,
HUBERT'S FRENCH EMERY PAPER.

EVERY FILE WARRANTED.
Equal to the
BEST.

Western Files. Western Files.

Works, Beaver Falls, Pa. Office, 96 Chambers St., N.Y.

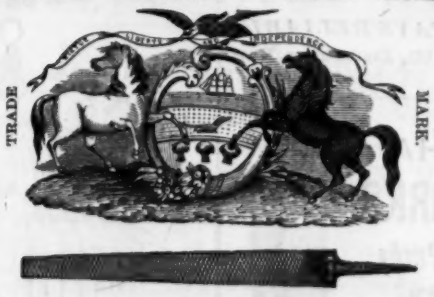
Western Files. Western Files.

LARGEST CAPACITY
Of any File Works in the World.

In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

PENNSYLVANIA FILE WORKS.

Illustrated Catalogue and Price List

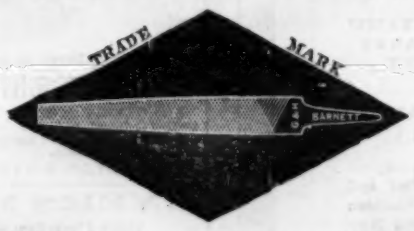


Sent to the Trade on application.

McCAFFREY & BROTHER,
Manufacturers of FIRST QUALITY FILES and RASPS ONLY,
Nos. 1732, 1734 & 1736 North Fourth St., Philadelphia, Pa.

Black Diamond File Works.

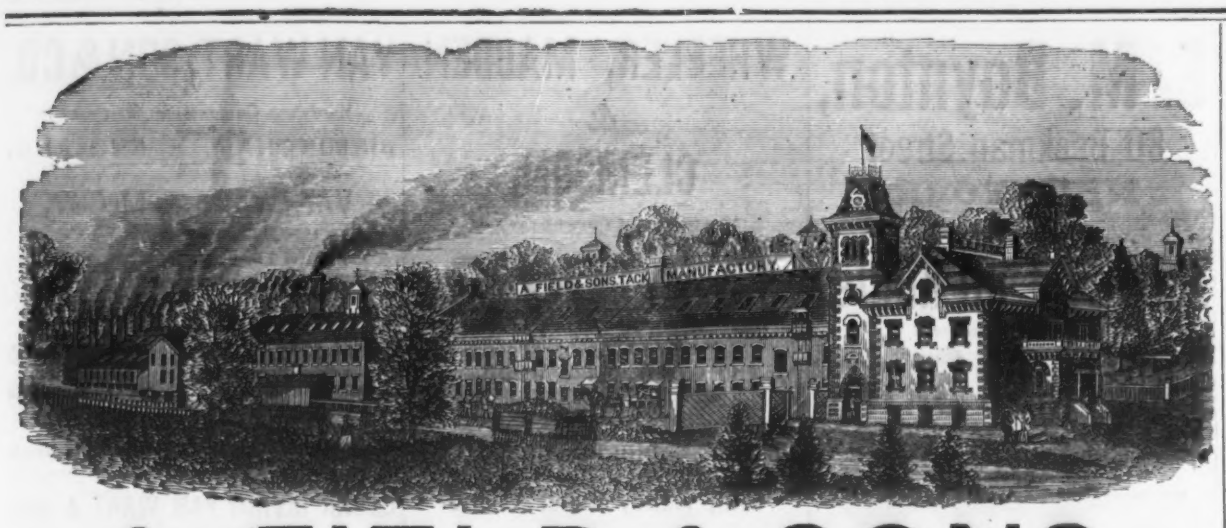
Send for Illustrated Price List.



Send for Illustrated Price List.

G. & H. BARNETT, 39, 41 & 43 Richmond St. Phila.

LINFORTH, KELLOGG & CO.,
Sole Agents for the Pacific Coast, 3 & 5 Front St., San Francisco, Cal



A. FIELD & SONS,

TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS. for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and teel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Paten Copper Plated Tacks and Nails

Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks. Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

☞ Any variations from the regular size or shape of the above named goods made from samples, to order. ☜

Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

69 Duane Street, N. Y. **Works, Darlington, N. J.**

Hand Made Locks and Real Bronze Hardware.

NEW AND ARTISTIC DESIGNS FOR

Private Residences, Banks, Churches and Public Buildings.

Iron & Brass Wood Screws.

Full assortment constantly on hand.

ALFRED FIELD & CO.,

Importers,

93 Chambers Street, N. Y.

PECK & SNYDER'S "American Club Skates."

FOR LADIES, GENTLEMEN OR BOYS.

We manufacture the following sizes, which, in ordering, must correspond with the length of the shoe worn: 8—9¼—9—9¾—10—10¼—11—11½ inches. These skates are made of the best material and in the best manner, requiring no Heel-Plates or Key. They are conceded by experts to be the most desirable skate now in market. Adjust the clamps A and B to the size of the foot by turning the thumb-screw D; when once adjusted, close the lever C, and the skate becomes securely locked to the foot.

	Full Polished.	Nickel Plated.
Price, with Blued Foot-Plate, per Pair	$3 75	$5 00 $6 25
The Clipper Club Skates, per Pair	2 60	3 25 4 50

We are also manufacturers of Straps and Skate Trimmings of every description.

Agents for Winslow's Wood Top Skates. Trade catalogue with discounts on application, Address

PECK & SNYDER, 126 Nassau Street, New York.

Anti-Friction Metal,

INGOT BRASS, BRASS CASTINGS.

Du Plaine & Co.,

1303 & 1305 Buttonwood St., PHILADELPHIA.

PORTABLE PIPE AND BOLT

Threader and Cutter

Cuts off and threads from ⅛ inch to 3 inch Pipes and Bars. Also taps Nuts and Centers work ready for Lathe. One man can thread 3 inch Pipe with ease with Dies furnished with machine. No Pipe splitting; no bevel inside or out. Requires no skilled labor.

A Full Set of Sockets and Lengths for Making Nipples Furnished with each Machine.

ANY SOLID DIE CAN BE USED IN THIS MACHINE.

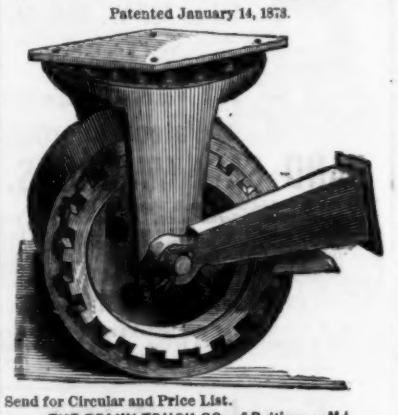
Send for Circular.

EMPIRE MFG. CO., 18 William Street, N. Y.

Gold Medal at Md. Ins. Exposition, Oct. 1874.

Endless-Lever House & Weight Mover.

Patented January 14, 1873.



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THE REAMY TRUCK CO. of Baltimore, Md.

Incorporated, Oct., 1874. Reliable State Agents Wanted.

OTIS PASSENGER —AND— FREIGHT ELEVATORS

FOR HOTELS, OFFICE BUILDINGS, STORES, WAREHOUSES, FACTORIES, MINES, BLAST FURNACES, &c.

OTIS BROTHERS & CO.

SOLE MANUFACTURERS,

348 Broadway, New York.

Licensed by United Nickel Company.

NEW YORK

Nickel Plating Co.

Works, 133 & 135 W. 25th Street,

Office, No. 18 Park Place,

ISAAC ADAMS, Jr., Prest NEW YORK.

Philadelphia Nickel Plating Works.

John Hartman,

No. 1042 Ridge Avenue, Philadelphia.

ELECTRO-NICKEL PLATING

On all Metallic Articles finished in the best manner.

Office, 615 Jayne Street.

BUSINESS ITEMS.

NEW YORK.

The Elmira Rolling Mills have secured a contract for the Chippewa Falls and Western Railroad.

Gilbert, Bush & Co., of Troy, have been building some passenger coaches for the Canada Southern Road.

The extensive rail mill at Rome, which has been idle ever since the middle of August, resumed operations on the 24th ult.

The Cedar Point Iron Company have just completed two hot blast furnaces at Port Henry. The stack is 70 feet high and 27 feet in diameter. The casting house is of brick, 70x60 feet. The boiler room is also of brick, 72x66 feet; the engine room is 66x66 feet (under it is a basement 12 feet high), 32 feet high. The engine is a side lever condensing engine, 1200 horse-power. Four Knowles pumps (the two largest of a capacity of 3000 gallons each, per minute) are in use.

NEW JERSEY.

The Wilson Iron Company, of Morris county, just organized, have taken possession of the Splitrock Forge property, and will immediately commence the erection of a furnace known as the Wilson patent, for the manufacture of iron in blooms.

PENNSYLVANIA.

The plate mills of the Pottstown Iron Company manufactured 600 tons of plate iron during the past four weeks.

The National Locomotive Works, at Connellsville, have closed a contract with the Cairo and St. Louis Railway, which will employ the establishment all winter.

The Ætna and Onondaga Iron Company commenced during the past week to make pressed point clinch nails.

The Pittsburgh Steel Casting Company have 19 steel melting holes, a 24-pot Siemens furnace and an open hearth Siemens furnace. The capacity of the works is 24 tons of steel castings per day.

The puddling department of the Philadelphia and Reading Railroad Company's Rolling Mill, at Reading, will probably run full time all winter. The rail mill will only run one-half and one-third time.

St. Clair Furnace went in blast for the first time on the 18th ult. It is an anthracite furnace, 12½x40 feet.

The Lehigh Valley Railroad will soon equip all its passenger cars with the vacuum brake.

The Bellefonte Car Manufacturing Company is about to start up in full force on a large order for freight cars.

MASSACHUSETTS.

The Clark & Chapman Machine Company, at Turner's Falls, have orders enough on hand to last them until next March. They are putting in a $2000 three-foot turbine wheel for the Montague Paper Company.

The Lowell Boiler Works were almost entirely destroyed by fire the 6th inst. The buildings burned were not costly, but valuable machinery was damaged, and the total loss is set at $10,000; insured in the following companies: Atlas, of Hartford; Merchants, Newark, N. J.; Westchester, New York; Liverpool, London and Globe. Mr. Cowley has the exclusive right to manufacture and sell steam press plates, made on Dobbins', Westar's and Dennis's patents, in Maine, New Hampshire, Massachusetts and Rhode Island.

The Northampton Emery Wheel Company have just received two more awards from the Franklin Institute Fair, held at Philadelphia in October. One prize consists of a silver medal for the superiority of their machinery, and the other a bronze medal for emery wheels.

The Washburn & Moen Wire Company, at Worcester, which has been running full since March, is to go on three-quarters time for the present.

East Douglas is quite prosperous for the dull times. The axe company's works are running full hours, and all the workmen employed. Lee & Murdock, lessees of the Douglas Woolen Company's mill, are doing a thriving business.

The Beverly Machine Works are building a lot of contractor's steam shovels, for M. D. Marcy, of Worcester.

ILLINOIS.

Arrangements have been perfected at Sheridan for the immediate erection of a large building in which to manufacture the McEwen harvester, a new machine recently patented by Mr. McEwen, of Lisbon. A company has been formed, and stock subscribed to the amount of $60,000. Mr. McEwen, of Lisbon, and Messrs. Mason and Hamer, of Ottawa, will be the active managers of the enterprise.

The Litchfield Car Manufacturing Company has a capital of $100,000, and has been organized and at work about four years. The company have an extensive foundry, and manufactures car wheels enough to supply themselves and other parties, also. They manufacture passenger and freight cars. The full capacity of the works, when fully manned, is about $100,000 worth of cars, wheels, etc., per month.

INDIANA.

The Southwestern Car Works, at Jeffersonville, recently delivered 30 freight cars to the Chicago, Danville & Vincennes Road.

The Indianapolis Rolling Mills have an order for several hundred tons of iron rails for the Indianapolis, Bloomington & Western Road.

The Ohio Falls Car Company, of Jeffersonville, has made punctually the second payment, amounting to about $100,000, on the extension notes given last winter, at the time of its partial suspension.

MISSOURI.

The Scotia Iron Works, at Leesburg, were incorporated in 1869 with a capital of $100,000. The company own about 10,000 acres of land, a portion of which is timber land, which furnishes charcoal, and the balance, ore land, the principal feature of which is two ore banks of red oxide and blue specular ores, which yield fifty per cent. in furnace. They have one charcoal furnace, the dimensions of which are—stack, 40 feet in hight, 9 feet 4 inches at boshes. This furnace has just completed a ten month's run, having made 8529 tons of metal, 7132 tons of it being No. 1. During the month ending November 1, it made the extraordinary run of 1033, 1736-2268 tons.

OHIO.

The Enterprise Rolling Mill, of Youngstown, is ready for operations. Trial of the engine and machinery was made on Saturday last, and proved highly successful. The engine cost $15,000, and was manufactured by the Atlas Works, of Pittsburgh, Pa. It is a 28-inch cylinder, five feet stroke, and has a capacity equal to 350 horse-power. The fly-wheel is 26 feet in diameter, and weighs 26 tons.

The Dayton Ohio Car Works have just turned out 25 cars for the Plainsville and Youngstown Railroad.

The rolling mill of Brown, Bonnell & Co., at Youngstown, has suspended operations on account of the depressed conditions of trade.

Struthers Furnace, at Struthers, near Youngstown, has been thoroughly overhauled and stack rebuilt during the past summer. It has been in blast since October. This furnace is 54x16 feet, and has a daily capacity of about 50 tons.

CONNECTICUT.

Business is brisk at Landers, Frary & Clark's, New Britain. Work is much behind orders, and the company are badly driven. Three hundred and eighty men are now employed in the new buildings, and one hundred and fifty in the old, ten hours a day. The pay roll last month was $30,000

The New Haven Wheel Shop Works have been rebuilt. The new engine will be one of the Harris-Corliss make, of 175 horse-power, with 20 inch cylinders, 4 feet stroke, fly-wheel 16 feet in diameter, with a thirty-two inch face and crown for two double belts. The works will be in running order January 1.

MAINE.

The Bangor Foundry and Machine Company recently cast a bed piece for the new engine, to be used in the workshop of the jail, weighing 5000 pounds.

NEW HAMPSHIRE.

The Manchester Locomotive Works are running on orders for a number of engines from the Intercolonial and Northern Colonization roads, in Canada.

DELAWARE.

The new buildings of the Tasher Iron Works, at Newcastle, are rapidly approaching completion. In addition to the old shops of the Newcastle Locomotive Works, which have been altered and fitted with machinery, there are four new buildings; the bending and welding mills, each 144 by 283 feet; a finishing mill, 150 by 300 feet; and a gas producing house, 40 by 128 feet, all of brick, and constructed in the most substantial manner. There are also a large boiler house and two engine houses, in which are engines of 250 and 150 horse-power. A railroad, built by the firm, who own their own cars and locomotive, connects with the Delaware Railroad, and also with their wharf, which extends out in the Delaware about 800 feet. The machinery in these mills is of the most approved pattern, calculated to produce, at present, about six miles of tubing or pipes per day. The sheet iron used here is made at Gray's Ferry and at Norristown and Coatesville, no one mill having sufficient capacity to manufacture all the iron needed. In making the boiler tubes and pipes, the welding is done by gas instead of coal fires. The gas is made in large "producers," and is passed through iron pipes overground, and flues underneath, to the welding furnaces, where the pipes to be welded are laid. So intense is the heat produced by the gas that the pipes are welded at the rate of one a minute, or about fifty tons every twenty-four hours by the four furnaces now in use. The making of tubes and pipes appears to be quite simple, if we lose sight of the intricate machinery, most of which is hidden underneath the floor. The first operation to be performed is trimming the rough edges from the plates, after which they are placed in a furnace, and, when properly heated, bent to the desired size by machinery. From this they go to the welding furnaces and thence to the finishing mill, to have the ends trimmed and to be cut in proper lengths. So far over $600,000 have been expended in these improvements, and by the time they are completed to their full capacity, as much more, perhaps, will be required.

Lake Superior Iron Ore and Pig Iron Shipments.

The following are given as the complete statistics of the iron ore and pig iron shipments from the opening to the closing of navigation this year as compared with last:

IRON ORE.

	1873. Tons.	1874. Tons.
From Marquette	526,264	427,009
From Escanaba	479,712	285,307
From L'Anse	60,899	87,193
Total	1,066,875	799,509

PIG IRON.

From Marquette	25,997	29,515
From Escanaba	9,348	12,745
From Grand Island	.....	13,679
Total	35,345	55,939

The product of the several mines and furnaces is given as follows:

ORE.

	Tons.		Tons
Cleveland	93,536	Shenango	5,429
Lake Superior	81,521	Rolling Mill	4,151
Champion	46,420	Edwards	2,848
Washington	26,874	Winthrop	3,810
Republic	112,341	McComber	2,641
Keystone	3,069	Lake Angeline	1,114
Kloman	34,541	Spur Mountain	42,068
New York	8,824	Michigammi	45,125

PIG IRON

Michigan Iron Co	8,911	Ishpm'g peat Fur	450
Morgan Furnace	7,060	Iron Cliffs Co	175
Bancroft Furnace	3,596	Bolling Mill	1,761
Champion Furnace	408	Bay Furnace	7,579
Grace Furnace	5,699	Munsing Furnace	6,100
Carp Furnace	1,378		

Iron manufacturers in Belmont county, Ohio, are seriously considering the propriety of reducing the wages of operatives.

The *Revista Militare* states that the adoption of the new Krupp 305 millimetre gun for the German coast artillery has been decided upon. A gun of this kind was exhibited last year at Vienna.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.

IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

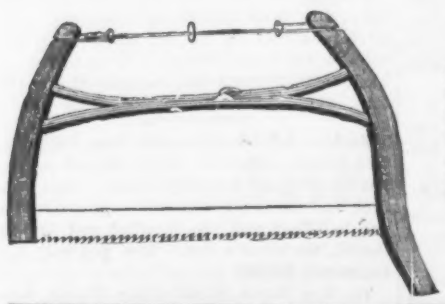
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,

MANUFACTURER OF

Saws of all kinds.

FACTORY, WILLIAMSBURGH, N. Y.



Elliptic Forked Saw Frame.

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS.
WILLIAMSBURGH, N. Y.

THE SILVER STEEL DIAMOND CROSS-CUT SAW.

$1.50 Per Foot.

PATENT HANDLES AND GAUGE INCLUDED.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the

SOLE MANUFACTURERS FOR THE UNITED STATES.

So confident are we that this is the best Cross-cut Saw in the market that we CHALLENGE THE WORLD. Orders promptly filled.

E. C. ATKINS. H. KNIPPENBERG.

E. C. ATKINS & CO.
Saw Manufacturers and Repairers, Indianapolis, Ind.

Lloyd, Supplee & Walton,

HARDWARE FACTORS.

MANUFACTURERS OF

Bonnev's Hollow AUGERS.

Stearn's Hollow Augers and Saw Vises

Bonnev's Spoke Trimmers

Double Edge Spoke Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks!

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

R. E. NEIL, President. H. A. LANMAN, Treas. & Manager. F. G. WADDEL, Secretary.

COLUMBUS BOLT WORKS,

COLUMBUS, OHIO,

Manufacturers of BEST NORWAY IRON

Carriage, Steeple, Cone, Shackle, Elliptic, Shaft and Tire

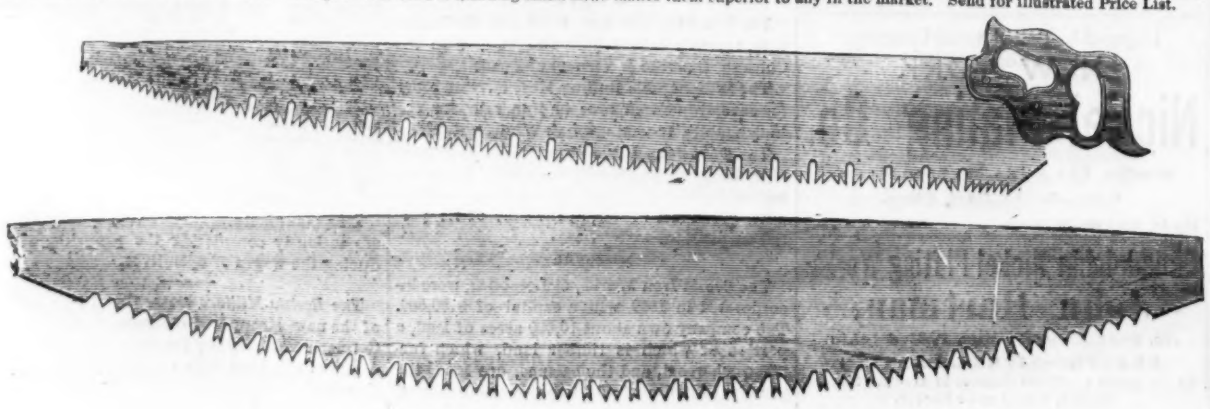
BOLTS

All the different styles used by the manufacturers of the finest Carriages. Every Bolt warranted true to size and fit. Illustrated Price Lists mailed on application. Our facilities are unsurpassed for the manufacture of **Machine Bolts and Coach Screws.** Correspondence from Car, Bridge and Machinery Builders solicited.

J. FLINT & CO.,

Manufacturers of all kinds of SAWS and PLASTERING TROWELS, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.



E. M. Boynton,

80 Beekman Street,
NEW YORK,

Manufacturer of

Saws of all kinds.

Also Sole Manufacturer of

LIGHTNING SAWS.

Two Direct Cutting Edges, instead of one Scraping point.

Note extra steel and durability over the old **V**, outlined on **M** tooth.

I am willing and extremely anxious, on proper notice, to accept a Challenge from H. Disston & Sons, or any responsible Saw Manufacturer, and am ready to back my words with appropriate deeds and $500 expense, if beaten.

N. B.---With Hand, Billet or Cross Cut Saw, $500 on each.

E. M. BOYNTON.

Putnam's Government Standard FORGED

HORSE SHOE NAILS.

Manufactured from the best of **NORWAY** Iron, nd warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
NEPONSET, MASS.

First & Pryibil's

461 to 467 W. 40th St.
New York City.
Salesroom,
48 Cortlandt St., N. Y.

Patent Improved

BAND SAW MACHINES.

For Bevel and Square Scroll Work and Re-sawing. Manufacture six different sizes. Prices, $165, $210, $270, $360, $395, $425, and $1000. Also manufacture CARVING, SHAPING, FLUTING, ADJUSTABLE DOUBLE SPINDLE BORING, CARVED and SERPENTINE MOLDING MACHINES. Also, GENERAL and COUNTER-BALANCED OVAL TURNING LATHES for WOOD and BRASS TURNING, METAL SPINNING, etc.

CIRCULAR SAW BENCHES, SHAFTING PULLEYS, and HANGERS.

A large assortment of the best FRENCH BAND SAW BLADES, at greatly reduced prices. And a Machine that will set an ordinary Band Saw PERFECT in two and a half to three minutes.

Faught's Patent ROUND BRAIDED Belting.

THE BEST THING OUT.

Manufactured only by

C. W. ARNY,
301 Cherry St., Philadelphia.
Send for Circular.

WHEELER, MADDEN & CLEMSON,

Manufacturers of Warranted Cast Steel

SAWS

of every description, including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws,

&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

FACTORIES:

Middletown, Orange Co., N. Y.

BRANCH OFFICE:

97 Chambers Street, New York.

BRUNDAGE FORGED HORSE NAILS,

Manufactured from

BEST NORWAY IRON,

by BRUNDAGE & CO. Sold by

WHEELER, MADDEN & CLEMSON

Middletown, Orange Co., N. Y.

I make a specialty of the LARGEST SIZES of **Circular Saws**, and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am sole proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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The Sugar Maker's Friend.

PRICE, $4.50 per hundred.

More agents wanted to canvass for the sale of **Post's Patent Galvanized Metallic Eureka Sap Spout and Bucket Hanger.** Samples, Circulars and Terms sent on receipt of 20 cts to pay postage. Address,

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June 8, 1862; April 6, 1869
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Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK, &c

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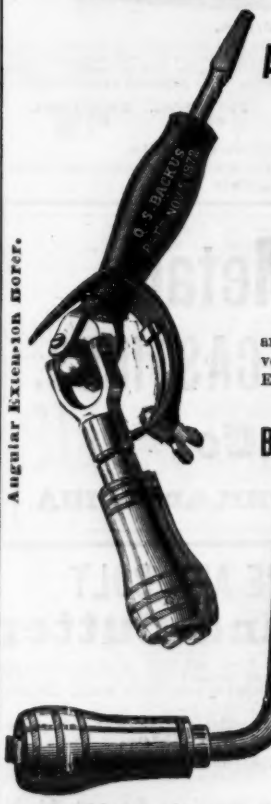
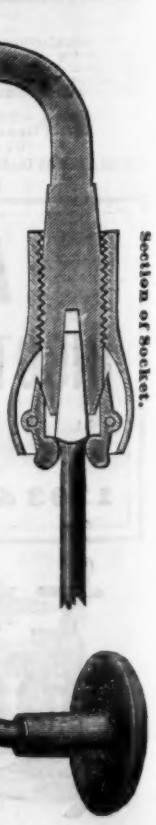


Angular Extension Borer.



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The socket is arranged so that the strain does not come on the jaws, but on the square hole which fits the shank of the bit. The jaws attached to the sleeve hold the bit firmly in the square, and center it truly. The sweep is of wrought iron. The general finish of the stock is good. Its appearance is neat. Mechanics who have used it unanimously pronounce it superior to all others; and we offer it to the trade as the strongest, most simple, and quickest operating brace in the market. We manufacture five sizes. The number of inches of sweep corresponds with the commercial number of the bit.

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The **only Knives made** that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife.** We also make

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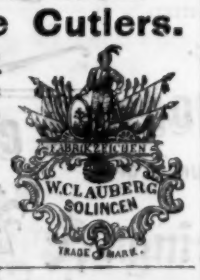

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MANUFACTURED BY *PEPPERELL,*

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My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass. Mechanics' Ass'n Sept., 1860

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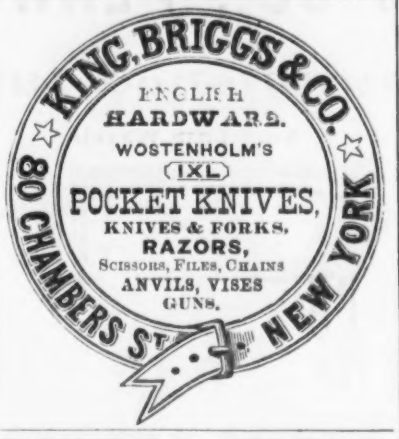

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AGENT FOR

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CELEBRATED CUTLERY,

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The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.

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Manufacturers of **Patent Brass Pad Locks for Railroads and Switches.** Also, **Patent Stationary R. R. Car Door Locks. Patent Plan and Sewing Machine Locks.**

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Patented Steam and Hydraulic, April 1, 1868.

EAGLE PACKING,

Of various sizes for **ENGINES and PUMPS,** manufactured by JAMES GLANDING & CO., No. 115 Queen St., Philadelphia. What the proprietors claim for the Eagle Packing: 1. Its general adaptation to all purposes for which packing is used. 2. Its durability. It will outlast any other article in use. 3. Its cheapness. It can be furnished to the consumer at a lower rate than any other packing

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Dec. 14, 1874.

The week just closed has been one of considerable excitement, both from the reception of the message and the meeting of Congress, as from the pig iron meeting and the Bell-Whitwell dinner given by the iron men. As to the former, whatever may be the spirit of the public press, it assuredly does not, in supporting the resumption policy, indicate or express the true feeling of business men as they express their own honest convictions on 'change or in the street. I have especially sought the views of manufacturers in all branches on this point, as well as of merchants and business men generally, and whatever the feeling may be in other cities, it is not in favor of any effort at an early resumption of specie payments here. Contrary, also, to the general tone of the papers, I find a very considerable portion regarding with favor Judge Kelley's plan of the 3·65 convertible bond. These men honestly believe it is for the true interests of the country that such a party as is proposed by the Indianapolis movement should be formed, and say that the ridicule and sneers of the press against it are ill-timed. They say that this movement is no one-horse operation, gotten up in a garret, but that the men who inaugurated it now control the Legislature of the great agricultural and manufacturing State of Indiana; that they are receiving letters of approval and support from all sections of the country, and that Judge Kelley knew perfectly well the position he stood in before he issued his letter. They point in evidence of these statements to the expression of opinion by the meeting of pig iron men as the first important gathering held since the promulgation of these ideas. The vote here was very nearly unanimous in favor of the 3·65 bond measure, and against specie payment in any form. The opposition was principally from one member alone, Mr. McCormick, of Harrisburg, a gentleman who is a Democrat, and naturally a hard money man. Further, they say that the action of a portion of the press in personally abusing Judge Kelly is simply based on personal enmity, arising from his interference in preventing certain jobs at Washington, and will not affect the politico-financial movement he recommends. All these statements are, it is to be remembered, from active business men, and if the feeling elsewhere be as strong as is here shown—of which, of course, I have no means of knowing—it seems very likely that the new party, especially if it should take strong tariff grounds, will obtain the support of most of the manufacturers and producers of the country. As to Congress, it is felt that at this session nothing will be or can be done relative to finances, and from this or some other reason—just what it is hard to say—a very general feeling prevails that trade will suddenly improve with the opening of the new year, and that before the middle of January we will have active business again. Of this I can only give the fact that such is the universal feeling without pretending to furnish a reason for it.

The pig iron meeting will be, of course, fully reported in your columns, and need not be detailed here. The action taken will probably have as much effect upon the decrease of production as any that could have been adopted, but it is not believed generally it will result in anything practical. The form of agreement adopted will be sent out at once, and it is thought by some of the parties who were present at the meeting that it will have an immediate and very general effect in curtailing production. Time alone can show this, and for this we must wait. The adoption of the resolutions opposing specie payments, and favoring a high tariff, and the 3·65 convertible bond plan of Judge Kelly, as well as of those opposing Canadian reciprocity, are generally received with favor. People are encouraged by seeing representative men like those here assembled take strong and well defined ground on any of the issues of the hour, and they regard it as an hopeful sign that these manufacturers had the pluck to put themselves thus on record against the policy of the administration. In this respect the meeting is regarded as probably the most important ever held by the iron interest.

The paper read by Mr. Edward Samuel, on the subject of warrant stores, as now in use in Scotland, is a very important matter, to which I shall refer as it deserves more at length hereafter. Mr. Samuel has had a very thorough experience as a prominent iron broker for years, and as such may be safely credited with a knowledge of the wants of the trade. The gentlemen forming the company to be organized for the purpose of establishing warehouses for storing pig iron are said to be among our best citizens, men of abundant capital and enterprise, and I am informed that the project receives the commendation of a large portion of the furnace companies in this State at least. I fully believe in the success of the movement, and am informed that it will certainly be put in operation very shortly, with at least the advantage of some reliable information about stocks of pig iron.

The Bell-Whitwill dinner, or banquet, was admitted, on all hands, to have been a very agreeable and enjoyable gathering. The guests of the evening were especially pleased with their reception, and as they sail on their return on the 16th inst., will take with them very kindly feelings of their American tour. Mr. Hewitt's address of welcome was particularly happy, and he fully recognized the value of Mr. Whitwell's hot blast in decreasing the consumption of fuel. Mr. Bell made an eloquent and practical reply, and in this, as in all his other addresses, showed his very thorough familiarity with, and great practical knowledge of, metallurgy. The visit of these gentlemen to the United States is of very great importance, and will, in one case at least, result in the investment of considerable sums in iron making in the Southwest. Beside this, the reports which they can make on their return, and the confidence with which their reports will be received, cannot fail to result in the purchase of large amounts of iron and coal lands for English account, and the construction of extensive iron and steel works at various points both North and South.

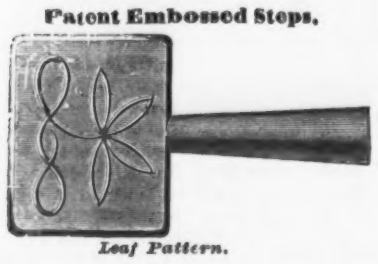
M. H. Jones & Co.'s Axe Factory.

Amongst the extensive iron manufactories of Cohoes, the above establishment takes rank as one of the most important. Indeed, it is acknowledged by all who have seen it, and are conversant with such manufactories, to be the best appointed establishment for the manufacture of axes and edge tools in the country. This proud reputation comes of the skill displayed in the arrangement of the different departments, under the supervision of the senior member of the firm, Mr. M. H. Jones, who, though yet a young man, is without a rival in his particular sphere At the early age of thirteen he entered an axe and edge tool factory, and, during the whole period of twenty-eight years which has since elapsed, he has devoted his time to mastering every detail of the business. Laboring for others he has superintended the erection and operation of a score of other factories in different parts of the U. S. and Canadas, making for himself the reputation of being a most successful manager of such establishments. The vast experience and practical knowledge thus gained he has since turned to good account in his own interest. On the dissolution of the famous Ten Eyck Manufacturing Company, in this city, a little more than a year ago, he leased their factory and appurtenances on very advantageous terms, and in an incredible short time succeeded in bringing order out of the sea of troubles which was the result of the mismanagement of the affairs of that company. Soon the superior quality and finish of the axes and edge tools manufactured by him began to be known, and orders were pouring in more rapidly than they could be filled. This was the situation when, on the morning of the 18th day of last January, the works were totally destroyed by fire. Still orders for goods were being received from parties in remote parts who had not yet learned of this seeming misfortune. The indomitable perseverence of Mr. Jones soon, however, overcome this drawback, and setting to work immediately he caused to be erected the present excellently appointed establishment. That destroyed did not come up to his conception of that which constitutes a first-class concern. There was a want of harmony in the situation and working of the different departments, which could only be secured by remodeling the whole. To do this would have entailed an expense almost if not quite equivalent to the cost of new and improved buildings. The fire settled the question, and the factory of M. H. Jones & Co. has taken the place of that held by Ten Eyck & Co., except that in the erection of the different structures constituting it this harmony has been secured, and the latest improved machinery alone is used. Scarcely six months elapsed from the time the fire occurred before the new establishment was running full blast, and on July 14 the first goods were shipped. Since that time there has been no lull, but every department has been taxed to its fullest capacity. To-day, notwithstanding the depression in other branches of iron manufactures, orders are received in advance of the power to fill them. Their goods are sold in every part of the United States, the British Dominions and South America. Latterly they have also been sending some to Germany. When the works were built they were designed to furnish employment to eighty men—the present force—but the indications are that they must soon be extended to provide for increasing business. In the original plan this contingency was kept in sight, and the buildings were so arranged as to admit of doubling the producing capacity at short notice and with comparatively little expense. The machinery is run by water, a full head of 21 feet turning a wheel of 200 horse-power. The supply of water, it need scarcely be said, is never failing, being furnished from the famous canals of the Cohoes Company, which turn a multitude of wheels and can supply power to four times as many more. The buildings, one 100 by 200 feet, one story, and the other 40 by 100 feet, two stories, are situated on the south bank of the Mohawk River. A splendid dock has been built, and all the iron and coal is received in bulk by water, coming by way of the Champlain Canal, the river at this point in fact forming a part thereof, by means of a dam situated just below the works, thus saving thousands of dollars to the firm in freights. The other member of the firm is Mr. A. G. Peck, a gentleman of abundant means, some years the junior of Mr. Jones, but a business man of undoubted capacity. He takes charge of all the outside business, the buying, selling, shipping and financiering. Mr. Jones' time is given wholly to the management of the mechanical part of the business, for which he is so eminently fitted. Few establishments have a brighter prospect ahead, and not many years hence we predict that, to the reputation of being the best appointed manufactory of axes and edge tools, will be added that of being the largest establishment of the kind in the country.—*Cohoes Democrat.*

In drawing certain numbers of iron wire, it often becomes necessary, in order to continue the use of the drawing bench, to anneal the iron. This is done in a hermetically closed receptacle, so as to avoid, as much as possible, the oxidation of the metal. In spite of this precaution, however, the latter becomes covered with an ochraceous film, which it is necessary to remove by an acidulated bath. It frequently happens, however, that, subsequent to this process, the metal becomes so brittle as to render its further drawing impossible. M. Seroz, engineer of the *Societe des Forges de La Frenche Compte*, has examined into this phenomenon, and finds that the iron becomes charged with a condensed gas. On breaking the wire under water in a test tube, inflammable bubbles were generated, which detonated in the air. The exact nature of the gas has not yet been decided, nor that of its direct action upon the metal; but it is believed to be either hydrogen or carbonic oxide.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



Leaf Pattern.

Star Pattern.

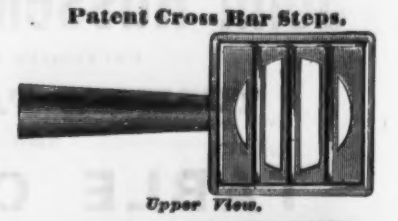
King Bolt Yokes.

Established 1850.

No. 6 Fifth Wheels.

1871 Pattern Shaft Couplings.

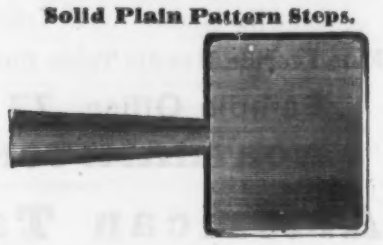
Patent Cross Bar Steps.



Upper View.

Lower View.

Solid Plain Pattern Steps.



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MANUFACTURERS OF A LARGE VARIETY OF FIRST-CLASS

FORGED CARRIAGE IRONS.

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FORT PLAIN SPRING & AXLE WORKS,

CLARK, SMITH & CO.,

Green Jacket Axles. FORT PLAIN, N. Y. Fine Carriage Springs.

MANUFACTURERS OF

English and Swedes Steel Springs, and Iron and Steel Axles.

Execute orders promptly for

Black, Bright, Tempered and Oil Tempered Springs,

ny Pattern or Style. Also for **AXLES of any description, from a COMMON LOOSE COLLAR to the FINEST OF STEEL.**

Our facilities for manufacturing are very extensive, and with our recent additions of new and improved hinery, we defy competition.

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CARRIAGE BOLTS.

Buy the Best.

Clark's Patent Carriage Bolt.

Best Bolt manufactured for all kinds of agricultural machinery. Will not split the wood, and can not urn in its place.

MANUFACTURED BY

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Also Manufacturers of

Plow and Machine Bolts, Coach Screws, Nuts, Washers, Tire Blanks, Rivets, &c

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CARRIAGE SPRINGS,

Superior Temper, Warranted.

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"STAR"

Carriage and Tire Bolts,

NORWAY IRON,

Button Head.

QUALITY GUARANTEED.

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IXL

Carriage and Tire Bolts,

CHARCOAL IRON,

Beveled Head.

QUALITY UNSURPASSED.

The Celebrated "STAR" Brand of Axle Clips.

Blank Bolts, Wood Screws, Square Head Bolts, Plow Bolts, &c., &c.

Our IXL Bolt is made from approved brands of Iron, and is equal in every point of appearance to the regular Philadelphia Carriage Bolts, being made on the same machinery, and the quality is not surpassed by any bolt of like grade in the market.

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Old Colony Rivet Works.

Rivets, Nuts, Washers, Lag Screws, Coleman's Eagle Carriage and Tire Bolts, Axle Clips, Felloe Plates, Shaft Couplings, Stove and Machine Bolts, Driling Machines, Tire Benders,

&c. Full stock constantly on hand. Warehouse, 116 Chambers St., N. Y.

ESTABLISHED 1837.

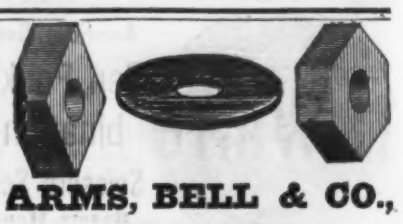
H. M. WENTWORTH & CO.

MANUFACTURERS OF

Carriage Springs & Axles

PAM, No 3 WATER ST., **Gardiner, Me.**

ALL GOODS WARRANTED.



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Manufacturers of

Carriage, Tire & Square Head Bolts.

Cold Pressed Nuts and Washers, Etc.,

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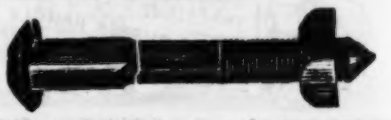

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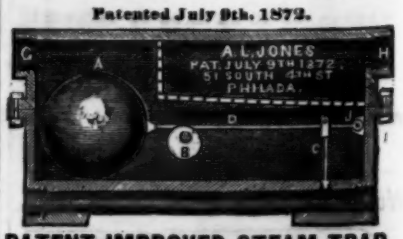

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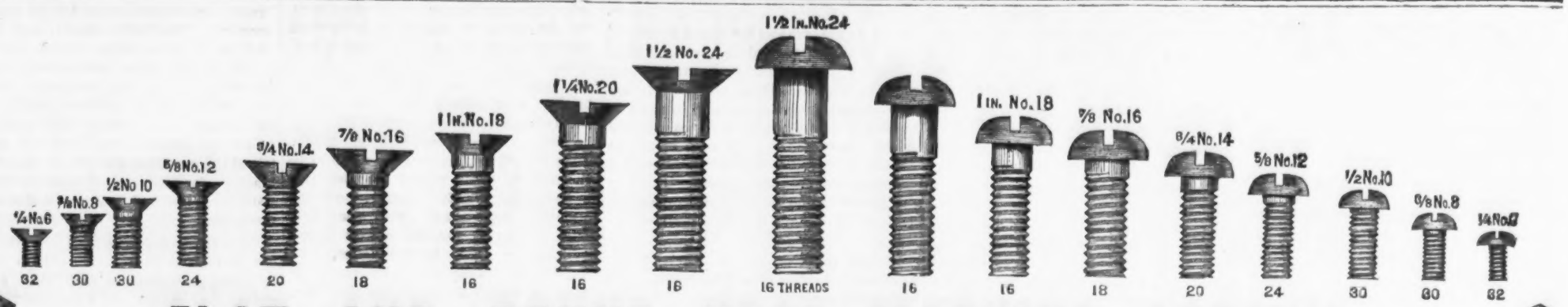

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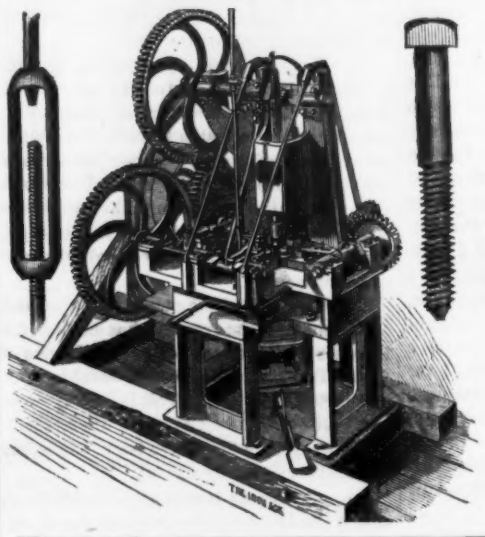

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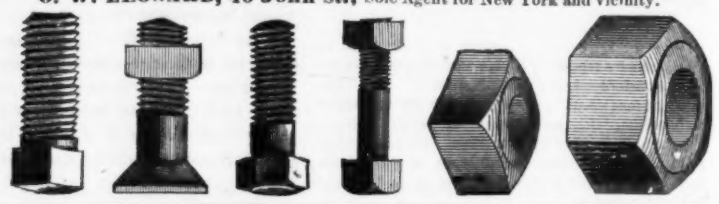

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The Iron Age.

New York, Thursday, December 17, 1874.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
JOHN S. KING . . Business Manager.

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The Pig Iron Trade.

The report of the meeting of pig iron makers, at the rooms of the American Iron and Steel Association, on Thursday last, published elsewhere, shows that the recommendation to reduce production, adopted as a resolution at the last meeting, has been supplemented by the adoption of a definite plan to secure that object, the success of which is, of course, dependent upon an honest desire on the part of at least two-thirds of the owners of furnaces, other than charcoal, to temporarily reduce production to what are, and for some time to come are likely to be, the requirements of the market. The meeting adopted an agreement, submitted by a committee appointed at the last meeting, which pledges those who may sign it to restrict the production of their respective furnaces to one-half of their capacity during the whole of next year, provided the agreement shall be signed by responsible representatives of two-thirds of the furnace companies of the United States other than those making charcoal iron. The only limitation upon the obligation thus assumed is found in a qualifying clause, which permits any one to withdraw from the agreement upon giving the secretary of the Iron and Steel Association two months' written notice of their desire and intention to do so.

Whether the requisite number of signatures can be obtained to this agreement to make it binding upon the signers, is a question upon which we cannot now express any opinion. There can be no doubt that the only immediate remedy for the existing depression in the pig iron trade, within the control of the makers of iron, is to restrict their production within the narrowest limits. Overproduction, under existing conditions, can only result in accumulating large stocks in makers' hands, and even with a large and legitimate consumptive demand, which must come when our industry and commerce shall recover from their present torpor, the knowledge that the market is overstocked, and that makers are anxious to realize, will prevent any appreciable advance in the price of pig. The policy advocated at the meeting is to a great extent compulsory. A few furnace owners, from superiority of plant, exceptionally favorable location or access to cheap materials, may be able to make iron at present prices without loss, but with a great majority of those engaged in the business there is but one course open. They must blow out and wait for better times. Many of those who have kept on in the hope of a reaction in the market, would have saved money had they blown out from six to twelve months ago, and for them to continue piling up iron or selling under cost for the next six months, would seem to be folly. This conclusion they have generally reached, and while there were some differences of opinion among the gentlemen present at the meeting as to the expediency of an attempt to organize a combination in the trade, there were no differences as to the necessity for a lessened production to save the trade from ruin. For our own part, we question the expediency of a trade combination organized on the basis of a written agreement as regards next year, but if the desired result cannot be brought about in any other way, there is much to be said in favor of it. It is impossible, however, to make such an agreement binding. Experience has shown that every man does, and common sense teaches us that every manufacturer should, consult his own interests before he considers those of his neighbors. If he can profitably make iron, there is no reason why he should refrain from doing so because his neighbor cannot; but he should be governed in his action not by a narrow selfishness which seeks present gain or present exemption from heavy loss, at the expense of the future. Enlightened self interest is a very different thing from this. It looks to the ultimate result of a policy, and often compasses the grandest results by making temporary sacrifices. We have had too much of selfishness in the councils of the iron trade; let us now have a little more of intelligent foresight, and, if need be, some present sacrifices on the part of the few who can weather a long season of dullness and prostration, to insure a brighter future for all. In a general way, whatever helps the trade helps all who are engaged in the trade, and while we approve of every man's remaining free to do what he believes will best promote his own interests, he should bear in mind that his true interests are often furthered by following a course different from that which a narrow selfishness might dictate. Whatever individual makers may think about it, there can be no doubt that the opinion of the trade at large, as regards the necessity for a restricted production, is the result of a careful and intelligent consideration of the situation and the outlook from many stand points.

Whether there are too many furnaces in the country or not, is a question we should not venture at this time to answer. Allowing for the number always out of blast, from one cause or another, we do not believe that the disproportion between the amount our furnaces can supply, on an average, and the amount which would be needed to meet the requirements of a legitimate and healthy consumptive demand, is as great as many suppose. We do not doubt that there are many old and obsolete furnaces, blown in during the season of high and advancing prices for iron, which will never again be profitable to their owners. Many of these will probably be abandoned permanently, and if these are counted we probably have too many. But of economical modern furnaces of large capacity, well built, and managed by competent engineers who bring science to the aid of practical experience, there are none too many. In the future, more than in the past, the race will be to the swift and the battle to the strong, and the success or failure of furnaces during the next few years will be determined by the operations of the law which insures the "survival of the fittest." As old furnaces are pulled down and new ones built to replace them, we shall witness a gradual and permanent improvement in our iron making plant. We may also expect to see a growing interest in scientific investigation and experiment. As Mr. Gowan very truly said in his remarks at the Bell-Whitwell dinner last Thursday evening, the difference between the American and the English ironmasters has been, that while the former sat at the tap hole of his furnace, watching what came out in the shape of pig iron, the former has stood at the tunnel head, to see how much profit was wasted in gases and dissipated in air. Hap hazard methods will no longer pay. We must call the chemist and the metallurgist to our aid at every step, and without them we cannot hope to attain the highest results in the utilization and economization of the vast wealth of fuel and ores with which nature has supplied us. The furnace which makes the best iron and makes it the cheapest will never be the one too many at any time, whether of prosperity or depression.

The Stevens Institute of Technology and its Mechanical Laboratory.

The Stevens Institute of Technology has just closed the first term of its third year. The class which has recently been received has been found too large to be conveniently instructed, and it is expected that the class entering next year will be restricted in number by a competitive examination, and that the charges for tuition will be made nearly equal to those of other technological schools—about one-fourth the actual cost to the institution.

The department of engineering has recently received some useful and valuable additions to its collections from manufacturers, engineers, and other friends of the enterprise. Some of the more important of these are contributions to Professor Thurston's new mechanical laboratory, the establishment of which we urged some months ago, and the progress of which we took pleasure in announcing.

The liberality of the manufacturers, and of a friend of the movement, has enabled the Director to secure one of the later styles of Richle Bro's. Tensile Testing Machines, of a capacity of 20 tons. This is just erected, and is about to be set at work upon specimens of metal which have been sometime on hand awaiting its arrival.

Another earnest friend of the laboratory, and of the Institute, has purchased and presented one of the improved style of Professor Thurston's Autographic Testing Machines, made in the workshops of the school, thus giving the laboratory a second machine of this kind. The old machine will either be sold, or will be devoted especially to testing cast iron, to which its coarser scale best fits it. The latter machine has been doing good work, having more than paid for itself since the new laboratory was instituted, and since the fact was made known that its apparatus was to be used for the benefit of the public, for a fair compensation, as far as it could be so used without serious interference with the work of the college itself.

Some interesting investigations have been made recently. One gentleman, who had been experimenting on the improvement of the cheaper grades of Bessemer metal, has sent samples of each lot to the Stevens Institute Mechanical Laboratory to be tested. Receiving a report upon the strength and ductility, the elastic limit, the homogeneousness and other qualities of the material, with copies of the strain-diagrams produced by the machine, the experimenter learned precisely what he had accomplished, and then was enabled to proceed intelligently with his work, and finally produced a metal which the report of the director indicates to average 30 per cent. more resilient than the unimproved metal. Previously, the experimenter had been compelled to content himself with the ordinary determination of strength, and to obtain the best evidence of relative ductility and shock resisting power, which the rude old method of breaking with a sledge on the anvil could give him. He is still at work on the problem of producing a valuable material for ordnance from cheap metal.

At the November meeting of the Car Builders' Association, Prof. Thurston was requested to deliver a lecture on strength of materials, illustrating it by experimental examination of car wheel and car axle iron tests with the autographic testing machine of the mechanical laboratory. The results were remarkably interesting. Manufacturers brought in samples of their standard mixtures, and of experimental combinations of well known brands, and the strain-diagram disclosed at once their relative shock resisting power, the quality most needed in such adaptations. The lecturer stated, as a first impression derived from these experiments on car wheel irons, that the metal best adapted to such work would seem to be that which, having sufficient strength to carry the highest load to be anticipated, at the same time had most ductility and chilled well. Strength is usually secured by the sacrifice of ductility, the very strongest metals being brittle. There was, therefore, a golden mean to be determined, which would probably give the best results. This lecture and the following *conversazione* was some four hours in length, and the interest shown by members and invited guests indicated how fully our own views, as stated in earlier issues of *The Iron Age*, represent those of men of business in regard to the importance of a laboratory of technical research, such as that of which the germ, for we can consider even the liberal beginning made by the trustees of the Stevens Institute of Technology as but the merest germ of what may be hoped for in the future, has been just started at Hoboken.

The Department of Engineering has just been presented with a beautiful example of the Scott gear molding machine, and with a perfect little six-inch Burnham turbine water-wheel, made precisely to scale, and capable of doing considerable work. It is of the new 1874 pattern. Bickel's power multiplying machine is another contribution—a formidable looking mechanical nightmare of arms and levers, forming a combination of the perpetual motion order. A steam boiler and a pair of engines drive it, and it is expected that several times their power may be obtained at the other end of the machine.

A large and extremely interesting collection of iron ores, and of the cast iron and spiegeleisen, of which analyses were published in *The Iron Age* recently, have been presented by the Woodstock Iron Company, of Armiston, Ala., and the Pittsburgh Steel Casting Company are represented by a curiously complicated specimen of their steel castings, in which a horse-shoe and a large screw, a plow share and lantern, ratchets and bevel gear wheels are cast in one piece, of which the base is forged down and forms a tripod. One of our file companies has fitted out the workshop with an assortment of files, and another contributor has sent in a variety of lathe attachments.

Such generous appreciation is doing much for the school. Professor Thurston states that he is very rarely compelled to make a purchase, nearly everything needed being sent in by our liberal and intelligent manufacturers whenever it becomes known that it is required, or even that an article can be made useful. The funds of the school are thus spared and are applied in such other directions as are considered best and most serviceable to the enterprise. It is certainly gratifying to learn of such progress in so important a direction, and particularly where instruction in established science and the extension of research into new fields are carried on side by side.

Testing Steam Boilers.

A correspondent writes to us to ask whether, in our judgment, the occasional testing of a steam boiler by hydrostatic pressure is sufficient to determine its condition and guard against the danger of explosion under ordinary working pressure. As the subject is one in which a large number of our readers naturally feel an interest, we answer it editorially.

The method commonly employed is what is known as the hydrostatic test. As usually made, however, this method of testing is likely to result in serious damage to boilers without discovering such defects as broken or insufficient braces, corroded sheets, blisters and many other sources of danger, and boilers are often ruptured and strained at a very much less pressure of cold water, applied by ignorant and unskillful inspectors, than they could safely have carried of steam. A case in point may be mentioned, which shows how readily the fiber of iron may be permanently damaged by elongation, its structure changed and its tensile strength impaired by an injudicious use of the hydrostatic pressure. During the summer of 1868 a cylindrical boiler, made of ¼ inch steel plates, built at the Fort Pitt Iron Works, Pittsburgh, was tested under authority of the government, with a view to determining the relative advantages of steel and iron as a material for navy boilers. The trial was made in the presence of the proprietors of the Fort Pitt Works, and the government engineer under whose personal supervision the boiler was built, Mr. Thatcher Perkins, the eminent constructing and mechanical engineer, and others. When the pressure of cold water had reached 780 lbs., the "girth" of the boiler, measured with the steel tape used in taking its dimensions before the trial, was found to have permanently increased 3¾ inches in the direction of the circumference, though no breaks were visible, and at 820 lbs. rupture occurred. This boiler should, and probably would, have safely carried from 150 to 200 lbs. of steam continuously, under careful, intelligent and thorough inspection—which would discover and rectify the weaknesses resulting from corrosion by leakage and dampness, and have maintained the maximum strength of plates and bracing—for fifty years, if excessive hydrostatic pressure had been omitted during that period.

Were the hydrostatic tests required by law in this and other States always made by intelligent persons, and with warm water, they might, in connection with other tests, and the careful examination of the boiler in all its parts, be found useful. As commonly practiced by government inspectors, however, they do vastly more damage than is generally known. The supposition that a boiler can stand, without injury, a pressure of cold water one-third greater than it can, safely, of steam, is apt to lead to mistakes and give rise to dangers. No doubt a boiler can withstand a temporary strain one-third greater than its safe working pressure: but it must be remembered that when tested cold, a boiler is subjected to strains different in character and differently distributed from those to which it is subjected when expanded by heat. The hydrostatic test with cold water may, therefore, strain a brace or sheet far more than an equal pressure of steam would do, and this overstraining when cold may cause it to give way at a less pressure when hot than it could have carried with safety for an indefinite period had the water test been omitted.

From what we have already said, it will be seen that the chief objection to the hydrostatic test lies in the manner in which it is generally applied. For the reasons we have given, it is worse than useless as a means of determining the actual condition of a boiler and the pressure of steam it can safely carry; but it is useful for testing, not the ultimate strength, but the workmanship of boilers. Dr. Joule's method of applying the hydrostatic test, as described in Holley's "Railway Practice," and now employed by many experienced engineers, is to fill the boiler with water, and build a small fire on the grate. When the temperature of the water has been raised from 50° to 70° Fah., the safety valve is loaded to the point desired and the pump started. The rise of the pressure is noted by the ordinary steam gauge, and if the progress of the index hand, which is carefully watched, be constant and uniform, it may be inferred that the seams are tight and that the boiler has withstood the pressure without strain or incipient rupture. The starting or springing of any weak joints or bad work is certain to be indicated. To supplement this test, which, though satisfactory so far as it goes, does not show the actual condition of the boiler, every part should be carefully examined by an expert. When an inspector visits a boiler, he does so for the purpose of making himself thoroughly acquainted with it. To this end he should enter it through the manhole, carefully view its condition as to cleanliness, soundness of sheets, action of water used upon the surface of the iron, strength and sufficiency of bracing, and its best disposition with least weight and greatest accessibility to parts stayed; observing that the tension upon the several braces is uniform. Emerging, he should examine the sheets in the furnace, and along the bottom and sides of shell, sounding carefully with a light hammer to discover weaknesses, if any exist by reason of the burning or lamination of the iron, detect leakages, which always induce corrosion, see that there are no cracks in the plates, and that the boiler is properly set and sufficiently supported to prevent improper strains—and in this particular we learn there is much room for complaint: then to the top to see that there is no corrosion of the external shell by the leakages from its seams, or from pipe joints or other sources above, and that the pernicious practice of conveying the products of combustion over the top of the boiler in their passage to the chimney, as is frequently done, has not burned the plates and—in so inaccessible a place—laid the foundation for serious rupture, if not explosion. Then all fittings, including the safety valve, should be examined to see if in proper working order, and the steam gauge is tested. In a word, the boiler and its appurtenances should be thoroughly inspected, and its owners or users advised of such repairs or changes as are necessary to place the boiler in good working condition. Any expert, who thoroughly understands his business, can make this kind of an inspection, and if the owner of a boiler really wants to know its condition he can readily find out by employing a competent man to inspect it in the way we have described.

In concluding these remarks we would

urge upon boiler owners the importance of a thorough acquaintance with the boilers for whose safety they are responsible, morally if not legally. The worst of the evils resulting from laws establishing the various systems of inspection and license, is that they relieve those owing and using steam boilers from much of the anxiety they would feel otherwise for the safety of their property. Believing that the inspectors are experts, appointed for their eminent qualifications, that they conscientiously perform their duties in every instance, and that if a boiler withstands, without apparent injury, a given pressure of cold water, it can, with absolute safety, carry two-thirds that pressure of steam, boiler owners too often become careless as to the actual condition of their boilers. To effect a mistaken economy of working expenses, they neglect necessary repairs not ordered by the inspector, employ the cheapest men who can procure a license, and "trust to luck" for immunity from danger to life and property—glad of any excuse for neglecting those simple precautions of safety which, were they held to a stricter responsibility before the law, they would be compelled to observe. The same sense of security is felt when boilers have been placed under the care of an insurance company, but with this very important difference, that the company, having a pecuniary interest at stake, does for the boiler owner what, under other circumstances, he should be required to do for himself. We would advise all who use boilers not to feel that, by complying with the letter of the law, they have discharged any part of the grave responsibility which rests upon them morally, and which they should legally be required to assume.

The Bell-Whitwell Dinner.

On Thursday evening last, at the Continental Hotel, Philadelphia, the American Iron and Steel Association entertained Messrs. Isaac Lowthian Bell and Thomas Whitwell, the distinguished English ironmasters who have been in this country during the past three months.

About six o'clock, p. m., the members of the Association and the invited guests began to fill Parlor "C." of the Continental Hotel, and were presented to Messrs. Bell and Whitwell. A little before seven o'clock dinner was announced, and the company passed into the commodious dining room adjoining the parlor. Mr. Samuel J. Reeves, President of the Iron and Steel Association, took the chair at the head of the table, Mr. Bell at his right and Mr. Whitwell on the left, in company with Ex-Gov. Bigler, the venerable General Patterson, Mr. Morton McMichael, Prof. Leslie, and others. The foot of the table, on either side, was occupied by Hon. Daniel J. Morrell and Col. J. B. Morehead. About one hundred members and guests sat down.

The dinner was well served, *a la carte*, and occupied three hours. About 10 o'clock the cloth was removed and the Chair made a few appropriate remarks, concluding by proposing the health of Messrs. Bell and Whitwell, which was drunk standing. Hon. Abraham S. Hewitt, of this city, being requested to respond in an address of welcome on behalf of the Association, delivered an eloquent and rhetorical address which was received with great favor.

Mr. Bell, on invitation of the chair, responded.

Mr. Thomas Whitwell was then invited to speak, and gave a brief account of some of the things he had seen during his visit to the United States, more particularly the fire departments of our large cities, and the prison systems of the several states.

Mr. Gowan, President of the Reading Railroad, made a brief address. He was followed by Col. Thomas A. Scott, President of the Pennsylvania Railway. Among the other speakers were Gen. Morehead, of Pittsburgh; Mr. A. L. Holley, of New York; Mr. John Fritz, of Bethlehem; Hon. D. J. Morrell, of Johnstown; Ex Gov. Bigler, Gen. Patterson, Prof. Leslie, Prof. Raymond and others. It was nearly midnight when the company adjourned to the parlor to take leave of Messrs. Bell and Whitwell, and wish them a pleasant and safe homeward voyage. The utmost good feeling prevailed, and, for the time, even the prostration of the iron trade was forgotten and anxiety gave place to conviviality. Delay in securing a translation of the stenographer's notes from Philadelphia prevents our giving the principal speeches of the evening in this issue.

We are desired to state that the explosive compound which made such havoc at the new Bergen tunnel a few days ago was not "giant powder," as stated by us in our account of the affair, but a blasting powder consisting of ordinary black gunpowder and nitro-glycerine. Giant powder, otherwise known as dynamite, will not explode in open air unless brought suddenly to a temperature of 360° F. In all other respects the facts were as we stated.

Blast Furnace Averages.

Mr. Edward J. Hall, blast furnace engineer, of Buffalo, N. Y., has compiled from the results of extended and careful inquiry some interesting tables, copies of which he has sent us. We give them below on the authority of the compiler.

Table I shows the number built in each period, the extreme and average dimensions, and the per cent. of increase. These figures are partially inaccurate, because many works reported the present size only, and some gave the date of rebuilding instead of that of construction. This makes the difference less marked than it should be between the old and new forms:

TABLE I.

Date of Erection.	Number.	Least. Hight.	Least. Bosh.	Greatest. Hight.	Greatest. Bosh.	Average. Hight.	Average. Bosh.
1837 to 1840	7	30	8·5	30	10	30	9·5
1840 to 1850	49	30	9	55	18	44·6	10·6
1850 to 1860	51	28	8	60	22	46·7	13·4
1860 to 1870	46	36	12	72	18	53·1	15·5
1870 to 1875	74	50	11	80	20	59·1	16·9
Per cent. of Increase.		66·6	37·5	166·6	100	97·3	87·9

This table exhibits very clearly the experimental nature of the changes made. While there has been a decided, though somewhat irregular, progression, we find the relations between the hight and bosh constantly varying. At first the diameter of bosh was increased more rapidly than the hight, but since 1860 the reverse has been the case, and now the relative proportions are nearly the same as in the first furnaces, although all of the dimensions have been greatly increased. The following tables show the proportions now existing. In table II. the furnaces are arranged according to their hight, and in table III., according to the diameter of their boshes.

TABLE II.

Hight.	Number.	Least. Hight.	Least. Bosh.	Greatest. Hight.	Greatest. Bosh.	Average. Hight.	Average. Bosh.
20 to 30	5	28	8	30	9	29·6	8 3
30 to 40	32	33	10	36	15	37·2	12·4
40 to 45	33	43	10	45	16	44·4	13·2
45 to 50	53	50	10	50	19	49·4	14·2
50 to 55	39	52	12	55	18	54·2	15·7
55 to 60	38	58	14	60	22	59·6	16·3
60 to 65	17	65	14	65	18	63·9	16·2
65 to 70	6	66	15·5	67	23	67·7	18·2
70 to 75	2	75	20	75	20	75	20
75 to 80	2	80	18	80	20	80	19

TABLE III.

Bosh.	Number.	Least. Hight.	Least. Bosh.	Greatest. Hight.	Greatest. Bosh.	Average. Hight.	Average. Bosh.
8	2	28	8	30	8	29	8
9	2	30	8·5	30	9	30	8·75
10	5	33	10	50	10	40	10
11	6	39	11	50	11	45·5	11
12	31	32	12	52	12	42	12
13	21	36	12·5	50	13	44·8	12·8
14	37	34	14	65	14	48·1	14
15	30	36	15	65	15	50·7	15
16	60	45	16	70	16	57·8	16
17	9	50	17	60	17	57·2	17
18	16	50	18	80	18	58·9	18
19	1	50	19	50	19	50	19
20	4	60	20	80	20	72·5	20
22	1	60	22	60	22	60	22
23	2	67	23	67	23	67	23

Table II. shows that all but forty-seven furnaces lie between forty and sixty-five feet in hight. The thirty-seven below forty feet may be considered as practically out of date, except for special uses, while the ten above sixty-five feet must still be regarded as experimental. So far reports do not indicate an increase of production or diminution of fuel proportionate to the increase of capacity. The size, however, must not be condemned until it is clearly proved that their comparative failure may not be due to incorrect proportions, lack of blowing power, or some equivalent reason. An average of ten new foundry iron stacks, belonging to the following well-known companies, will illustrate the best recent practice. The furnaces selected are: No. 5, Allentown Iron Co., Allentown, Pa., built in 1873; Nos. 5 and 6, Thomas Iron Co., Hokendauqua, Pa., built in 1872 and 1873; No. 1, Niagara River Iron Co., Ironton, N. Y., built in 1873; Nos. 1 and 2, Olcott Iron Co., Albany, N. Y., built in 1873; Nos. 1 and 2, Crown Point Iron Co., Crown Point, N. Y., built in 1873; Nos. 1 and 2, Cedar Point Iron Co., Fort Edward, N. Y., built in 1874.

Hight of stack	63·2 ft.
Diameter of bosh	17·5 ft
Diameter of hearth	6·75 ft.
Slope of bosh	4·05 in.
Number of tuyeres	6
Number of boilers	7
Length of boilers	52 ft.
Diameter of boilers	38 in.
Diameter of steam cylinder	48 in.
Diameter of air cylinder	80 in.
Length of stroke	7 ft.

As a basis for comparison in construction and management the following data will prove serviceable. They give the extremes and average at present existing—of course no single furnace combines all the details of either set of figures.

	Least.	Greatest.	Av'ge
Hight of stack (feet)	28	80	51·3
Diam. of bosh (feet)	8	23	14·7
Diam. of hearth (feet)	3·5	11	6·75
Slope of bosh per ft. rise (in.)	3	5.5	3·94
Number of tuyeres	3	9	6
Number of boilers	4	12	7
Diam. of boilers (inches)	33	60	40
Length of boilers (feet)	26	112	55
Diam. of steam cylinder (in.)	24	66	42
Diam. of air cylinder (inches)	54	108	84
Length of stroke (feet)	4	12	7
Number of revolutions per minute	9	40	13
Cubic feet of air at 14·7 lbs. pres. blown per minute	3000	10000	6825
Pressure of blast in lbs. at receiver blown per minute	3·3	9	5·75
Temperature of blast in deg., Fahr.	400	1400	850

Furnaces intended exclusively for foundry iron differ from those intended only for forge iron in being a trifle narrower, having the boshes flattened about one quarter of an inch more, and having a little less tuyere area. The pressure of the blast averages one half a pound more, and the temperature about 100° higher.

These figures are given simply to show what is the average practice; if, however, iron masters after comparing these figures with their own, and allowing for difference in capacity, etc., discover marked variations some satisfactory reason should be found for them.

The size, relative proportions and conditions of working vary in almost every case, and no standard can be fixed. The location, character of stock to be used and grade of iron desired will always enable a competent engineer to determine suitable proportions and conditions, and such men only should be trusted with the construction and supervision of apparatus involving such great pecuniary interests as the modern blast furnace.

The Effect of Acid on the Interior of Iron Wire.

Prof. Osborne Reynolds, in a paper lately read before the Manchester Literary and Philosophical Society, says: At a previous meeting of this society, Mr. Johnson exhibited some iron and steel wire in which he had observed some very singular effects produced by the action of sulphuric acid. In the first place, the nature of the wire was changed in a marked manner, for although it was soft charcoal wire, it had become short and brittle; the weight of the wire was increased; and what was the most remarkable effect of all was that when the wire was broken, and the face of the fracture wetted with the mouth, it frothed up as if the water acted as a powerful acid. These effects, however, all passed off if the wire were allowed to remain exposed to the air for some days, and if it were warmed before the fire, they passed off in a few hours.

By Mr. Johnson's permission, I took possession of one of these pieces of wire and subjected it to a further examination, and from the result of that examination I was led to what appears to me to be a complete explanation of the phenomena. I observed that when I broke a short piece from the end of the wire the two faces of the fracture behaved very differently—that on the long piece frothed when wetted and continued to do so for some seconds, while that on the short piece would hardly show any signs of froth at all. This seemed to imply that the gas which caused the froth came from a considerable depth below the surface of the wire, and was not generated on the freshly exposed face. This view was confirmed when, on substituting oil for water, I found the froth just the same. These observations led me to conclude that the effect was due to hydrogen, and not to acid, as Mr. Johnson appeared to think, having entered into combination with the iron during its immersion in the acid, which hydrogen gradually passed off when the iron was exposed. It was obvious, however, that this conclusion was capable of being further tested. It was clearly possible to ascertain whether or not the gas was hydrogen, and whether hydrogen penetrated iron when under the action of acid. With a view to do this I made the following experiments:

First, however, I would mention that after twenty-four hours I examined what remained of the wire, when I found that all appearance of frothing had vanished and the wire had recovered its ductility, so much so that it would now bend backward and forward two or three times without breaking, whereas, on the previous evening, a single bend had sufficed to break it. I then obtained a piece of wrought iron gas pipe, six inches long and five-eighth inches external diameter, and rather more than one-sixteenth inch thick; I had this cleaned in a lathe, both inside and outside; over one end I soldered a piece of copper so as to stop it, and the other I connected with a piece of glass tube by means of India rubber tubes. I then filled both the glass and iron tubes with olive oil, and immersed the iron tube in diluted sulphuric acid, which had been mixed for some time and was cold. Under this arrangement any hydrogen which came from the inside of the glass tube must have passed through the iron. After the iron had been in the acid about five minutes small bubbles began to pass up the glass tube. These were caught at the top and were subsequently burnt and proved to be hydrogen. At first, however, they came off but very slowly, and it was several hours before I had collected enough to burn. With a view to increase the speed I changed the acid several times without much effect until I happened to use some acid which had only just been diluted and was warm; then the gas came off twenty or thirty times as fast as it had previously done. I then put a lamp under the bath and measured the rate at which the gas came off, and I found that when the acid was on the point of boiling as much hydrogen was given off in five seconds as had previously come off in ten minutes, and the rate was maintained in both cases for several hours. After having been in acid some time the tube was taken out, well washed with cold water and soap, so as to remove all trace of the acid; it was then plunged into a bath of hot water, upon which gas came off so rapidly from both the outside and inside of the tube as to give the appearance of the action of strong acid. This action lasted for some time, but gradually diminished. It could be stopped at any time by the substitution of cold water in place of the hot, and it was renewed again after several hours by again putting the tube in hot water. The volume of hydrogen which was thus given off by the tube after it had been taken out of hot acid was about equal to the volume of the iron. At the time I made these experiments I was not aware that there had been any previous experiments on the subject; but I subsequently found, on referring to Watt's "Dictionary of Chemistry," that Cailletet had, in 1868, discovered that hydrogen would pass into an iron vessel immersed in sulphuric acid. See *Comp. Rend.* lxvi., 847. The facts thus established appear to afford a complete explanation of the effects observed by Mr. Johnson.

In the first place, with regard to the temporary character of the effect, it appears that hydrogen leaves the iron slowly even at ordinary temperatures—so much so that after two or three days' exposure I found no hydrogen given off when the tube was immersed in hot water. With regard to the effect of warming the wire—at the temperature of boiling the hydrogen passed off 120 times as fast as at the temperature of 60°. Also when the saturated iron was plunged into warm water the gas passed off as if the iron had been plunged into strong acid; so that we can easily understand how the hydrogen would pass off from the wire quickly when warm, although it would take long to do so at the ordinary temperatures. With regard to the frothing of the wire when broken and wetted, this was not due, as at first sight it appeared to be, simply to the exposure of the interior of the wire, but was due to warmth caused in the wire by the act of breaking. This was proved by the fact that the froth appeared on the sides of the wire in the immediate neighborhood of the fracture, when these were wetted, as well as the end; and by simply bending the wire it could be made to froth at the point where it was bent. As to the effect on the nature and strength of the iron, I cannot add anything to what Mr. Johnson has already observed. The question, however, appears to be one of very considerable importance, both philosophically and in connection with the use of iron in the construction of ships and boilers. If, as is probable, the saturation of iron with hydrogen takes place whenever oxidation goes on in water, then the iron of boilers and ships may at times be changed in character and rendered brittle in the same manner as Mr. Johnson's wire, and this, whether it can be prevented or not, is at least an important point to know, and would repay a further investigation of the subject.

Preservation of Railway Sleepers.

A work has recently been published in France, entitled "A Treatise on the Preservation of Wood, Foods, and Various Organized Matters," in which the author, M. Maxime Paulet, chemist, recommends for railway sleepers, pit props, and wood generally, the use of sulphate of copper and creosote.

M. Paulet says: So far as the sulphate of copper is concerned, this salt is poisonous to the vegetable and animal parasites which appear at the beginning of all organic decomposition. The quantity of salts of copper should be excessive when the wood is intended to be immersed in water or buried in a moist soil, because the water dissolves this salt slowly; and since sea-water enters into combination with it still more rapidly, it should be excluded from use for wood used in the sea. There is, in wood impregnated with the salts of copper, a portion of the sulphate closely united with the liqueous tissue, and another portion in excess remaining free. This latter portion dissolves first, and, carried off by the exterior fluids, only retards the loss of the metallic salt combined with the wood; but this combination itself, although more stable, does not escape removal, being accelerated or retarded according to the rapidity and ease with which the dissolving liquid is renewed. On the contrary, the quantity of metallic salts should be diminished in wood intended for constructions in the open air, in order to prevent the mechanical effect of intra-vascular crystallizations.

As regards creosote oil, it is beyond doubt that the petroleum products, containing phenic acid, are preferable to the metallic salts for wood exposed to sea-water, because naphthalene, and especially phenic acid, exercise an antiseptic action, coagulate the albumen, and thus obstruct the circulation of the sap or blood of parasites. The volatility and the solubility of these preservative agents would render their antiseptic action temporary only, if the more fixed and thicker oils which accompany them did not inclose and retain the preceding substances, at the same time obstructing all the pores of the wood, and rendering difficult the access of dissolving liquids and destructive gases. On the other hand, grave objections have been raised, from a practical point of view, either because of the restricted production of these oils, which is not sufficient for a general use of them, or because the wood thus impregnated offers great danger from fire, this wood once on fire being unextinguishable; that, on the contrary, sulphate of copper, like all the metallic salts, renders the wood uninflammable.

On the subject of the preservation of wood the *Polytechnisches Centralblatt* has lately remarked that in 1862 Messrs. J. and G. Leuchs advised the boiling of railroad ties in paraffine, or coating them with this substance; but this operation did not seem practicable to Mr. Hock. In order to effect impregnation it is necessary to fuse the paraffine, and vapor of petroleum seemed to him the dissolvent best suited for this purpose. The ties are introduced into an iron cylinder or reservoir, heated on the outside by a steam jacket. The wood, already as dry as possible, is raised to the highest degree of desiccation by the introduction of steam into the jacket, and when no more vapor escapes from it the solution of paraffine is introduced into the cylinder by means of a tube and compressed air. This cylinder has a refrigerating coil which discharges into a closed receiver. Then steam is let into the jacket again. The liquid waters boiling, and the vapor of petroleum gas not being able to escape, the pressure inside of the cylinder rises, and is permitted to reach 75 to 100 lb. per square inch; at this pressure the wood is completely impregnated with the liquid. When this action has been prolonged sufficiently the heating is stopped, and the operator waits until the pressure has fallen to a minimum, and the excess of paraffine is drawn off into the reservoir. Now, in order to collect also the dissolvent absorbed by the wood, it is again heated. When the remainder of the vapor of petroleum has been dissolved, air is blown into the cylinder in order to drive out the gases which might incommode the workmen who take out the wood.

The paraffine remains distributed minutely within the wood between the ligneous fibres, envelops them, on melting, with a thin coating, and at the same time fills the pores and the cellular intervals. The wood is then guaranteed forever against moisture, while the dissolving of sulphate of copper, chloride of zinc, coal oil, etc., which have been recommended, are dissolved and carried off by water. Nails do not rust as in wood impregnated with metallic salts, and fragments of the preserved wood keep their value as fuel, while those of sulphated or zincked wood burn with difficulty.

The Rolling Mills of Pittsburgh.

The Pittsburgh *Commercial* publishes the following list of the establishments in that city closed in consequence of the puddlers' strike:

American Iron Works, Messrs. Jones & Laughlin—Seventy-two furnaces, employing four hundred men. Have on hand 1500 tons of muck bar, which will run the other departments of the mill, without the services of the puddlers, several months.

Lewis, Baily, Dalzell & Co.—Twenty-three furnaces; two hundred men out; firm unable to fill orders at present prices without a loss of $7 per ton.

Lewis, Oliver & Phillips—Thirty-two furnaces in Allegheny mill stopped; about one hundred and fifty men out. Mill on South Side, with forty furnaces and two hundred men, will close in a short time.

Glass, Neely & Co., Keystone Iron Works—Shut down their puddling mill Saturday. Have nineteen puddling furnaces and one scrap furnace, employing two hundred and sixty hands. They have sufficient muck bar to run their mills for four months without boilers.

Graff, Bennett & Co.—Seventy furnaces; about three hundred men. Have muck bar to sort up stock for several weeks.

Reese, Graff & Woods—Twenty-five furnaces; about two hundred men.

Lloyd & Sons—Twenty-three furnaces and one hundred and fifty men. Will shut down next week.

W. D. Wood & Co., McKeesport—Seven furnaces; about fifty men. Enough muck iron to run all winter.

J. Painter & Sons—Fifty-two furnaces; about two hundred and twenty men. Enough muck bar to run two weeks.

Chess, Smythe & Co.—Twenty furnaces; about ninety men. Enough iron to run all winter without puddlers.

Sligo Iron Works—Eighty puddlers and helpers out of employment.

Dilworth, Porter & Co.—Fifty boilers and helpers out. Enough muck iron to last over a month.

Everson, Macrum & Co.—Sixty-eight puddlers and helpers out. Are prepared to run several months without puddlers.

Wayne Iron Works, Black & Co.—One hundred and thirty employes discharged. Plenty of muck bar.

Pittsburgh Forge and Iron Company—One hundred men out. Muck sufficient to run several months.

Pittsburgh Bolt Company—Twenty four puddlers out. Can supply orders for some time from stock on hand.

Sable Iron Works, Zug & Co.—Three hundred and thirty-three men out of employment.

Shoenberger & Co.—Four hundred and fifty men discharged.

Carnegie, Kloman & Co.—Puddlers out; number not ascertained.

Solar Hoop Mills, William Clark & Co.—Decline to employ puddlers at present prices.

Moorhead & Co.—Twenty-two puddlers and six hundred other hands. Orders nearly run out, and will probably close in a short time.

Wilson, Leggatt & Co.—Fifteen furnaces shut down, and nearly two hundred men out.

Byers & McCullough—Fifty puddlers and four hundred other hands. Will probably shut down next Saturday.

The puddlers that are out of employment do not comprise one-fifth of the number of persons deprived of the means of earning bread for themselves and families. Those who will suffer most are the helpers and others whose work must cease on account of the action of the puddlers—they who receive the smallest wages, and, of course, are not able to lay away anything for a rainy day.

In an editorial note the same journal says:

The Eastern and Western papers, in giving an account of the puddlers' strike in this city, represent the number of strikers at 40,000. This is a gross exaggeration. The number of puddling furnaces at the mills here is given at 800, in round numbers. Four men—two puddlers and two helpers—are employed at each furnace, so that the strike involves, for the present, only 3200 men. As however, the suspension of work at the puddling furnaces must, in the end, involve the suspension of all other work at the mills, and also of the miners employed to supply the mills with fuel, it is estimated that, should the strike be persisted in, it will result, before the winter is over, in depriving from 15,000 to 20,000 men of work. This is the outside limit. There are really but 3000 men on strike.

The number of ships lost at sea, and never heard from after leaving port, would form a list almost as long as melancholy. The losses have generally been classed as "mysteries," which they were, doubtless, so far as a precise knowledge of their causes was concerned. But if we could have overhauled each of the ill-fated vessels, we should have found holes in the wooden hull filled with putty instead of bolts, a shaft in the steamer badly forged and full of flaws, or a boiler utterly inadequate to the duty assigned it. A recent incident has extended the list of probable causes of marine disasters, and bidden us look to the stowage as one of the sources of ocean casualties. No less than four large ships have recently been lost through the spontaneous combustion of their cargoes—and this same phenomenon may occur even when the entire cargo is not liable to self-ignition. But there is danger, also, in the juxtaposition of given elements of the cargo. The Red Gauntlet, a British passenger ship plying from a station between London and Bombay, was discovered to have in her hold—on the discharge of her cargo at the latter city—a barrel of gunpowder and a case of lucifer matches side by side. Of course, a sudden lurch of the ship and a slight movement of the cargo would have furnished us with another "mystery," while it solved the main one for the passengers.

Treatment of Tin Scraps.

In the manufacture of tin ware it is said about 6 per cent. of the whole of the plates employed disappears in the form of scraps. The enormous trade in sardine boxes produced at Nantes, in 1869, nearly 400 tons of scrap; Birmingham produces some twenty tons per week; and Paris fifty to sixty tons per month. A small quantity of these scraps has always been used in various ways, such as the addition of a small quantity to the pig iron intended for steam cylinders; another small portion was treated by concentrated sulphuric acid, or a solution of caustic potash; but no one treated tin scrap on a large scale until a short time since.

The utilization of a waste substance is like the saving of the penny, it helps to keep the pound unbroken, and the best method of utilizing such a large product as tin scrap becomes a matter of importance. The subject has been treated in the journals within a short period, but M. Kuenzel has taken up the subject in an exhaustive manner in the *Berg und Huettenmannische Zeitung*, which demands attention. The article is of considerable length, but we shall give the purport of it in the shortest space consistent with intelligibility.

The mode employed comprises four chief operations: (1) treatment of the scraps by means of boiling in water acidulated with hydrochloric and nitric acid, until all the tin is dissolved; (2) precipitation by means of zinc of the tin contained in the above solution, and washing of the precipitate; (3) solution of the precipitated tin in hydrochloric acid, and crystalization of the chloride of tin; (4) utilization of the iron scraps when despoiled of the tin.

1. Care in buying tin plate scrap is one of the first essentials in a financial point of view. Good tin scraps contain from 5 to 9 per cent. of tin. Of course, the thinner the plate the greater is the amount of tin. French tin plate has 1½ to 2 per cent. more tin than English, as the plates are rougher, but it is very important to remember that the French tin is often, probably almost always, mixed with lead, a fact which may be ascertained by wiping the tinned article with a clean handkerchief, when, if lead be present, it will show itself. If the lead exceeds 10 per cent. of the tin, the scraps should be refused, as they are more difficult to treat, and leave the iron in a worse condition. Lacquered tin boxes, like those used for French sardines, give bad scrap, for the lacquer has to be destroyed by heat, which reduces the amount of tin recovered. Sometimes the scrap does not contain more than 2 to 4 per cent. of tin instead of 6 per cent., beside being mixed with lead. Galvanized iron (*fer zingue*) should also be rejected. When not packed, scrap tin is very difficult to carry; a ten ton truck will not hold more than three to four tons; the best way, if possible, is to pack the scrap in old barrels or cases, and ram it down well. In France the scrap is made up into packets by being rammed into a wooden mold, rather broader at top than at bottom, and holding one or two cwt.; the packet is then fastened round with iron wire. The scrap thus packed must be well separated, or many pieces will stick together, and the action of the acid will be materially impeded.

2. The solution used to dissolve the tin is composed of one part of raw nitric acid and ten parts of raw hydrochloric acid. At first wooden vats holding about three cubic metres were used, but the acid destroyed them rapidly. The best vessels are those of stoneware, or vats of wood or of brick dressed inside with a hot mixture of one part of sulphur and two parts of sand. At the bottom of the vat, which should contain at least one metre cube, a vulcanite pipe is introduced through which steam may be introduced from a boiler. The vat, or back, is nearly filled with scraps, a three-metre vat will hold about 600 or 700 kilogrammes, the mixture of acids is then poured over the scrap, and water added to about four-fifths of the hight of the scraps; the steam is then introduced till the solution completely covers the scraps, and is contined until the whole of the tin disappears from the upper scraps, and hydrogen ceases to be disengaged, showing that the solution has become neuter. The boiling takes generally about half or three-quarters of an hour. A cock at the bottom of the vat allows the liquid, which contains all the tin, a certain quantity of chloride of iron and of chloride of lead when the tin is not pure, to run off into a receiver into which nearly all the chloride of lead is percipitated by cooling. For the treatment of 1000 kilos. of scraps, containing 5 to 6 per cent. of tin, the average quantity of acid employed is 300 kilos. of hydrochloric, and 30 kilos. of nitric, diluted with 3½ to 4 cubic metres of water, of which a small quantity is used to wash the iron left in the vat, but which is saved for the next operation. The iron is then removed by means of forks, and made up into packets of various sizes, according to the purpose intended. These must not be kept in heaps, for they oxidize rapidly, and the heat thus produced will even heat them to redness. A heap of about 100 tons was once burned in this way. For the treatment of three tons of scrap in twelve hours, six or seven vats, of about three cubic metres capacity each, are employed.

3. The solution cooled in the receptacle already mentioned is now transferred to a large wooden or brick cistern, filled with old zinc-plate or scraps, which precipitates the tin, and also any lead which remain in the solution. This process should not produce any gas, as that would show the solution to have been too acid, and cause a useless loss of zinc. From time to time a small quantity of the solution, slightly acidulated by means of sulphureted hydrogen, is tested to ascertain if the precipitation is complete. The operation is generally effected in two hours. When terminated, the solution is run off from the bottom through a filter made of sailcloth, which stops any of the tin precipitate which may be floating, and the liquid is of no further use. The zinc is then moved about to cause as much of the tin as possible to fall to the bottom, and the solution from another boiling is then introduced. This operation is repeated until this vat or cistern is one-third or half filled with tin. About sixty-five to seventy-five parts of old zinc are required to precipitate 100 parts of tin. Theoretically, it should only require fifty-five parts, and the overplus must be attributed to an excess of acidity and to the oxides of zinc and lead generally present in the old zinc.

The precipitate obtained, which is mixed with fragments of zinc and tin solder from the old zinc, is taken out of the vat and thrown on a metal sieve with holes about three or four-twenty-fifths of an inch in diameter, and a stream of water being directed on the sieve, the precipitate is carried on to a sail cloth filter. On the metal sieve will be found scraps of tin plate not affected by the acids, and some tin solder; the former is thrown into the boiling vat, the latter cast into ingots for sale. The precipitate is washed in the filter as long as any trace of iron remains, and is then placed in canvas sacks, and the water squeezed out by means of a screw or hydraulic press. The precipitate is employed in making chloride of tin; it is well to dissolve it in hydrochloric acid as soon as it is taken out of the press, or, at any rate, to sprinkle it with it, as otherwise the tin oxidizes rapidly, and the oxide will not afterward dissolve in the acid. It is far more advantageous to convert the precipitate into chloride than to cast it in metallic ingots, as the former, being very finely divided, is worth much more in the market. The mode of making crystalized chloride of tin is too well known to require description. The treatment of the residues insoluble in hydrochloric acid is important. These residues consist principally of chloride of lead and oxide of tin. These have been successfully treated in a small Belgian zinc oven, in which the residue is made of a red heat in six retorts, arranged in two lines, and inclining forward at a considerable angle, after being mixed with twice its own weight of fine, poor coal. If the residue contain sufficient chloride of lead, all the tin will be transformed into volatile chloride, which condenses in the retort, and metallic lead is also formed, partly in the neck of the retort, and partly mixed with the residue at the bottom, from which it is separated by washing. If there is not sufficient chloride of lead in the residue, some must be added from the receptacle, described in paragraph 2.

4. When only a small quantity of tin scrap is treated daily, and sulphuric acid can be obtained cheap, it may be advantageous to convert the iron from which the tin has been recovered into sulphate, but not when large quantities are dealt with. At Liege about four tons of tin scrap have been treated daily, which would give about twenty tons of sulphate of iron. Such a quantity could not be placed advantageously in Belgium. It was necessary, therefore, either to find other applications or remove the prejudice against such scrap iron. This scrap, made up into compressed packets, yields, with a loss of 20 to 25 per cent., an extremely brittle iron, but which may be rolled hot, and then presents an excellent surface. The demand for this was, however, small. Another method, which succeeded better, was to make up the scrap in bundles of about 10 pounds each, and to introduce them into the puddling furnace to the extent of from 10 to 20 per cent. of the charge. The packets should be put in when the iron is most covered with scum. This scrap iron exerts an especially favorable influence on pig containing much phosphorus, the puddled iron gains in quality, and the production is notably increased in quantity. White pig iron of excellent quality has been obtained by smelting this scrap in a reverberatory furnace, mixed with turnings of gray pig to the extent of two to five. About 800 tons of this iron scrap have been sold in England, but for what purpose is not stated.

The cost of treatment on the basis of the price of iron in 1869-'70, less the general expenses, is given as follows: 1 ton of tin scrap, 60 fr.; 30 k. of hydrochloric acid, 9 fr.; 30 k. nitric acid, 15 fr.; 35 k. old zinc, 10 fr. 50c.; labor, 20 fr.; fuel, 2 fr. 50c.; total, 117 fr. Result—50 k. tin precipitate, 150 fr.; 800 k. scrap iron, 24 fr.: total, 174 fr.

The industrial result depends upon the yield of tin, and, consequently, upon the careful purchasing of the scrap, for at the prices of iron in 1869-'70 a yield of 3 per cent. of tin would not cover the cost of the operation.

Special Notices.

Wanted to Hire,
A Rolling Mill with Puddling Furnaces.

With particulars as to location, number of furnaces and the machinery, with terms. Address **H.,**
Office of *The Iron Age*, 10 Warren St., N. Y.

Charcoal Blast Furnaces.

Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, and having a competent corps of workman constantly in my employ, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported upon when solicited. Correspondence promptly attended to.

J. M. WHITE, Engineer,
22 W. Alexander St., Rochester, N. Y.

A Machinist and Draughtsman
Experienced in Steam Engine, Blast Furnace and Mill Work,

Wishes to buy an interest in a Machine Shop & Foundry.

Address **MACHINIST,**
Office of *The Iron Age*, 10 Warren St., N. Y.

Tenders Invited,

Separately or together, for Iron and Spikes required in the construction of a large Propeller for the Lake trade.

Delivered on cars at Pittsburgh, Buffalo, Detroit or Toronto.

W. Kough, Hardware Merchant,
OWEN SOUND, ONTARIO, CANADA, Nov. 12, 1874.

Special Notices.

"Special Notice."

WANTED.—To exchange, *First-Class Improved City Property,* in the city of Philadelphia, to the amount of *one hundred thousand dollars, clear of all incumbrance,* for a *good article* of Pig Iron for same amount, to be delivered here. Address **IRON,**
P. O. Box 2841, Philadelphia.

Wanted,

By an experienced man who has a large acquaintance with the wholesale and retail hardware and house-furnishing merchants thoughout the West, a position as traveling salesman. Can furnish good city references. Address, **P. A. C.,**
Office of The Iron Age, 10 Warren St., N. Y.

A Situation Wanted

As Superintendent or Foreman in an Iron or Machine Works, by a man 40 years of age. Has had 20 years' experience in running machinery work, iron and brass foundry. Understands drafting and getting up new machinery for specl l purposes. Is also a practical workman at all branches connected with machine work. Also, the management of men and works, and office business connected with such work. Address **C. L. J.,**
Office of *The Iron Age*, 10 Warren St., N. Y.

Wanted.

A capable and energetic young married man wants employment in any business capacity, manufactory or salesroom, in New York or elsewhere. Has had some six years' experience in the Hardware business, and three years' in a manufactory of saws and machinery. References unexceptionable. Address, *Salesman,* 288 S. 9th St., Brooklyn, E. D., N. Y.

A gentleman having some experience in the iron business, with best connections and large means, seeks an interest in some respectable firm. Banking or manufacturing preferred. Reply solicited only from those engaged in business which will bear the closest scrutiny.

Address, **A., Box 4250, P. O., N. Y.**

A Roller wants a situation as a steady and experienced workman on either guide, hoop or bar iron. Can turn rolls and take care of steam engines and machinery. For further particulars, address,
Boonton, N. J., Box 96.

AGENTS WANTED.
SPECIAL INDUCEMENTS.

We want a first-class agent in every county in the United States, and also in Europe, to sell the world-renowned Wilson Shuttle Sewing Machine, and the Wilson Manufacturing Machines, to whom we are prepared to offer Extraordinary Inducements. For full particulars, apply or address **Wilson Sewing Machine Co.,** 827 & 829 Broadway, N. Y.
Special Inducements to Exporters.

An iron worker of large experience in this country and England, with the best testimonials as to character and capacity, wishes an engagement as manager or foreman of a mill or forge. Has had 20 years' experience in the manufacture of bars, hoops, plates, sheets, and puddle steel.

Address, **J. L.,**
Office of The Iron Age, 10 Warren St., N. Y.

Manufacturers Attention.
LABOR TO HIRE.

Wanted to hire out, the labor of 250 convicts in the Missouri State Penitentiary. Two Shops, 150 by 50 feet each, with main Shafting and Pulleys in Shop, with all the Steam Power needed. The finest opening in the West for a Furniture Shop, or for Wagon Material, Handles and Hames Manufactory. Any portion of the above hands will be hired.

Also, a first-class opportunity for parties to engage in the manufacture of Men's Boots and Shoes, or Agricultural Implements. Ample shop room. Timber of all kinds very abundant. Correspondence solicited.

Address *HUGH L. FOX,*
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THE CANADIAN BANK OF COMMERCE.

Capital - - $6,000,000, Gold.
Surplus - $1,800,000, Gold.

The New York Agency, No. 50 Wall Street, buys and sells Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, J. H. GOADBY, } **Agents.**

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desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

A PARTNER WANTED

by the 1st of January, 1875, in an established Hardware business, who can put in from $20,000 to $25,000, either cash, or stock suitable for jobbing trade.

For particulars, address, *B.,*
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HARDWARE.

FOR SALE in the best business part of Jersey City, a first-class *Tool* and *Hardware* business. Established about 25 years, and doing a fair business.

Apply to *H. LUTIGEN,*
57 Montgomery St., Jersey City.

EUGENE BISSELL, AUCTIONEER.

By BISSELL & CO.,
Successors to R. T. HAZELL & Co.,
Store No. 94 Reade Street.

Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

THE

McHaffie Direct Steel Castings Co.
STEEL CASTINGS,

Solid and Homogeneous, guaranteed to stand a Tensile Strain of 25 tons per square inch. An invaluable substitute for expensive **WROUGHT IRON FORGINGS** or for Iron Castings, where great strength is required. Office, cor. **Evelina and Levant Sts., PHILADELPHIA.**

Send for Circular and Price List.

Special Notices.

NOTICE

Is hereby given that goods for the exhibition at Diocjakarta, Dutch East Indies, (see *The Iron Age,* Nov. 12, first editorial) will still be in time if shipped by steamer ROTTERDAM, December 24th.

L. W. MORRIS, Agent,
Morris European Express,
50 Broadway, N. Y.

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap Iron.

GILCHRIST & GRIFFITH,
Mount Pleasant, Iowa.

TO INVENTORS.

Patents secured in the United States and Europe, on the lowest terms and very

PROMPTLY,

by **A. V. BRIESEN,** Solicitor of Patents and Attorney at Law in Patent Cases.

258 Broadway, N. Y., cor. Warren St.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. **There is a special claim on each of the Dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

THE

Fletcherville Blast Furnace Co.,
Manufacture

CHARCOAL PIG IRON,

Exclusively from New Bed Pure Magnetic Ore, suitable for Bessemer, Malleable and Car Wheel purposes, or for foundry use where very soft and strong iron is required.

Analysis of Average New Bed Pure Ore.		*Analysis of No. 1 Bessemer Pig.*	
Metallic Iron	68·240	Undetermined matter and loss	·134
Oxygen with iron	26·010	Silicon	1·019
Water	·380	Carbon	3·821
Insoluble silicous matter	4·330	Phosphorus	·048
Sulphur, practically none		Sulphur, practically none	
Phosphorus	·038	Calcium	·140
Alumina	·280	Metallic Iron	94·838
Lime	·140		100·000
Undetermined matter and loss	·592		
	100·000		

Witherbees & Fletcher,
Port Henry, Essex Co., N. Y.
Furnace at FLETCHERVILLE, near Mineville, N. Y.

J. M. WHITE,
Architect and Constructor of Charcoal Blast Furnaces. Plans, Specifications and Estimates of construction furnished upon application.

Office address,
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A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.
Cash paid for allkinds of **Metals** and **Tools.**

Wanted.

A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, which the advertiser understands in all its branches. Highest references of character, capacity, &c.

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For Sale.

LOWE & THOMASSON,
Chattanooga, Tenn., Dealers in
MINERAL LANDS,

Surveys Made and Titles Investigated. Parties desiring information or wishing to purchase ore or coal lands within the States of Tennessee, Alabama or Georgia, are respectfully requested to communicate.

We have For Sale Very Cheap
Two of the
Finest Charcoal Properties

in America. Brown Hematite Ore, 56 per cent. Metallic Iron, and less than 1-20th of 1 per cent. of Phosphorus. Car Wheel Iron can be made for $16 per ton.

Also, 6400 Acres Bituminous Coal Lands, for which part payment will be taken in Northern Pacific R. R. Bonds.

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A new machine for making Boiler Rivets, from one-half inch to inch. Also new machine for heading screw bolts from three-eights to inch. Duplicates of each in successful operation for ten years. Will exchange for bar iron or wrought scrap.

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BUFFALO Union Stove Works
For Sale.
CENTRALLY SITUATED.

Has always done a good business, which, with the addition of a few new goods, can be greatly enlarged. This is one of the best constructed foundries in the country. Will be sold with all its patterns and fixtures at a bargain, if sold soon. Apply to or call upon **A. REID, Att'y for GEO. B. BULL & CO.,**
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Hardware, Plumbing & Gas Fitting Business For Sale.

About 200 miles from New York. Lease to run four years. No opposition in the Plumbing or Gas Fitting business. Parties purchasing will have a good and satisfactory business from time of purchasing, doing a large satisfactory business.

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For Sale, &c.

For Sale.

A Zinc Mill, consisting of Rolls, Furnaces, Shears and Tools, all in complete order, ready to run at once. Situated near New York on leased ground. Lease covers buildings, engine and boilers, and is a valuable one, having privilege of extension. For full particulars, address,

Box 2166, N. Y. P. O.

For Sale or Rent on Easy Terms

A four story brick factory 46x60 ft. with unfailing water power of about 25 horse-power, auxiliary steam engine of 20 horse-power. Adjoining are office, barn and other outbuildings. Situated near depots of three railways, and lines of boats to New York and Philadelphia. Every facility for manufacturing and getting goods to market at cheapest rates. Apply in person or by letter to either

JOSEPH W. ALSOP,
ROBERT N. JACKSON,
CHARLES E. JACKSON, } Executors.
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Hardware Business For Sale,
In Denver, Colorado.

The stock and trade of an old established house, favorably known throughout the Territory. Stock clean and in good order. Trade large. Long continued illness of proprietor, sole reason of sale.

Address, *JOHN HARPER,*
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Manufacturers of
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Solicit correspondence from parties having **Tinners' Specialties** and **Goods** in our line of manufacture to sell. A large acquaintance with the trade of the Northwest makes us desirable mediums for manufacturers and inventors for introducing and selling their goods in connection with our own.

WM. E. TANNER & CO.,
Metropolitan Works.
Manufacturers of
Steam Engines, Boilers and other MACHINERY,
Canal St., from 6th to 7th, Richmond, Va.

In addition to a full line of new engines, boilers, saw mills, and other machinery of our own manufacture, we have now on hand and will sell at very moderate rates, the following lot of **second-hand machinery,** viz: 3 Double Hoisting Engines, suitable for mining, tunnelling or other purposes. Each of these engines has two cylinders, 7½ in. diam. by 18 in. stroke; two drums, 4 ft. diam. by 4 ft. long; geared to engine in proportion of 8 to 1, and are provided with disconnecting gear and friction brakes.

One 150 Horse-Power Stationary Engine, with heavy fly wheel, all complete, and nearly as good as new.

Three Return Tubular Boilers, (70 three inch tubes each), 15 feet long, complete with steam drum, fronts, valves, grates, &c., suitable for the above engine.

One 10 Horse-Power Portable Engine of our own make, complete, with two driving pulleys, "Judson" governor, &c., nearly new, and in excellent order.

One 30 Horse-Power Portable Engine, with circular saw mill, saw and belt complete, in first rate order.

Three 4 Horse-Power Stationary Engines. Cylinder, 4 in. by 10 in.

One 30 Horse-Power Stationary Engine, as good as new, complete, with "Judson" governor, fly wheel, &c.

One 30 Horse-Power Stationary Engine, in good running order, but not as new as the above.

One 16 Horse-Power Stationary Engine, with new vertica lboiler.

One Otis Hoisting Engine, in good order.

Two Flue Boilers, 26 ft. long, 42 in. diam., each with two 14 in. flues, iron front, grates, &c., in good order.

One Flue Boiler, 34 ft. long, 48 in. diam. with two 14 in. flues, about as good as new.

One 7 Horse Portable Engine, of our own make, used only a few months, and in perfect order.

Two No. 6 Sturtevant Blowers. Two No. 4 McKenzie Blowers. One No. 6 Andrew's Centrifugal Pump. One No. 6 Turbinate Centrifugal Pump. Three No. 0 Cameron Pumps. One No. 2 Cameron Pump. One Knowle's Pump. One Earle Pump.

Thirty Brass Tubes, 1¾ diam., 12½ ft. long.

Send for illustrated catalogue and Price Lists.

To Quit Business.

Will sell the best appointed Hardware Store Building in the State of Ohio, with or without stock. Doing a very large and satisfactory trade. No bonus for the trade. Parties purchasing will have a good and satisfactory business from the opening. Property rents at good prices.

For particulars inquire of
JOHN E. BYRNE,
99 Chambers St., N. Y.
JAMES C. JACOBS, Wooster, Ohio.

To Rent.

First and third floors—together or separate. Brick building 125x50, well lighted and the best business location in the city. Light power will be supplied if desired, or parties can furnish their own if preferred. Address, with particulars,

H. D. STANLEY, Secretary,
Bridgeport, Conn.

FOR SALE.

An 8½ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.

Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

FOR SALE.
At Lowest Manufacturers' Rates.
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By *LOUIS WINDMULLER & ROELKER,*
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FOR SALE,

£1. German consular instructions in English, published by subscriber, who is extensively employed by manufacturers for translating **Catalogues, Circulars, Letters & Prices Current** from and into the English Spanish, German and French. The manufacturers forward these circulars to addresses contained in **Lever's Foreign Directory,** and orders are constantly received in answer thereto. Address,

C. KIRCHHOFF,
Commercial Editor "El Cronista,"
Box 2806, N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Dec. 16, 1874.

The spasmodic activity in the financial markets, noted in our report of last week, has given place to dullness, and there is but little of general interest to note. The money market is extremely easy again. Borrowers on call are freely accommodated at rates averaging about 4 per cent., and mercantile paper is freely discounted at 6 @ 8 per cent.

The bank statement showed a smaller reduction in reserve than was expected, principally because of the heavy coin payments of the Treasury for five-twenty bonds redeemed. The following is a comparison of the bank averages for the past two weeks:

	Dec. 5.	Dec. 12.	Differences.
Loans... ...	$286,663,000	$284,903,300	Dec. $1,159,700
Specie.....	14,467,200	14,218,800	Dec. 248,400
Leg. Ten....	50,221,700	49,470,300	Dec. 751,400
Deposits....	219,632,100	218,408,000	Dec. 1,224,100
Circulation..	25,012,100	24,804,300	Dec. 208,300

The gold market has been strong, in the main, with an upward tendency. The following shows the extreme daily range of the premium:

	Highest.	Lowest.
Thursday	111¼	110¾
Friday	111¾	110¾
Saturday	111⅝	111⅜
Monday	111⅝	111⅜
Tuesday	111¾	111⅝
Wednesday	111⅞	111⅝

The market for government bonds has been heavy, without weakness. Railroad bonds were strong and in good demand, and State bonds quiet but strong.

The stock market has been alternately steady and heavy, with but little business of any kind doing. The principal speculation has been in Pacific Mail, Lake Shore, Northwest, Western Union, Erie and Wabash. The interest centers chiefly in Pacific Mail, which has lately been brought very prominently before the public by the efforts of the officers to obtain a subsidy from Congress. The highest and lowest of to-day's quotations of active shares are given below.

The following tables show the foreign trade movements for the week:

IMPORTS.

	1872.	1873.	1874.
Total for week..	$6,925,711	$4,519,164	$5,531,358
Prev. reported...	400,317,046	364,459,112	365,146,528
Since Jan. 1....	$407,242,757	$368,978,276	$370,677,886

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	122	$1,082
Brass goods	21	1,399
Bismuth	1	686
Bronzes	45	8,711
Chains and anchors	104	4,929
Copper		8,217
Cutlery	57	25,704
Guns	70	8,504
Hardware	56	7,597
Iron, pig, tons	926	27,413
Iron, sheet, tons	76	13,122
Iron cotton ties	315	1,007
Iron, other, tons	268	11,264
Lead, pigs	7,869	50,458
Lead, tons	4	413
Metal goods	83	11,030
Needles	12	4,787
Old metal		591
Platina	2	1,923
Plated ware	5	1,276
Per. caps	21	4,516
Saddlery	8	1,198
Steel	1,497	35,062
Tin, boxes	10,470	96,487
Tin, 2817 slabs	149,981	32,230
Wire	605	1,859
Zinc	33,150	2,036

EXPORTS EXCLUSIVE OF SPECIE.

	1872.	1873.	1874.
For the week...	$4 586,084	$5,375,913	$6,541,803
Prev. reported....	22,003,963	282,349,109	269,321,960
Since Jan 1....	$225,590,047	$287,725,024	$275,863,773

EXPORTS OF SPECIE.

Total for the week	$2,774,900
Previously reported	50,884,201
Total since January 1, 1874	$53,659,101
Same time in 1873	47,325,102
Same time in 1872	68,261,332

Government bonds closed strong, with quotations as follows:

	Bid.	Asked.
U. S. Currency 6's	116⅛	117
U. S. 6s 1881, reg	116¼	117⅛
U. S. 6s. 1881, cou	120½	121
U. S. 1862, 5-20 reg	113	113¼
U. S. 5-20 1862, cou	113	113⅛
U. S. 5-20 1864, reg	114¼	115
U. S. 5-20 1864, cou	115	115¼
U. S. 5-20 1865, reg	116½	117¼
U. S. 5-20 1865, cou	117⅛	117⅜
U. S. 5-20 1865, reg. new	116	116¼
U. S. 5-20 1865, cou	119½	119⅝
U. S. 5-20 1867, reg	116¾	117
U. S. 5-20 1867, cou	120¾	120¾
U. S. 5-20 1868, reg	116⅝	117
U. S. 5-20 1868, cou	120⅝	120¾
U. S. 10-40 reg	113⅛	113⅞
U. S. 10-40 cou	114⅛	114⅝
U. S. 5s, 1881, reg	113¼	113¾
U. S. 5s, 1881, cou	113	113¼

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	100⅝	100⅜
Lake Shore	80¾	79¾
Rock Island	101⅝	101¼
New Jersey Central	107⅜	107⅛
Del., Lack. & Western	108¾	108
Michigan Central	81¾	81⅜
Wabash	29	28⅜
Western Union Telegraph	83¾	83¼
Northwestern	47	46⅜
" Pref	61	61
Milwaukee & St. Paul	37⅞	37¼
" " Pref	53¾	56
Pacific Mail	39⅝	38
Erie	27¾	27¼
Ohio & Mississippi	31	30⅜
Union Pacific	35⅛	35
Quicksilver	34⅛	34¼
Consolidated Coal	48	48
Wells, Fargo & Co. Express	82	82

GENERAL HARDWARE.

Trade continues much in the same condition noticed last week. Now that the results of the year's business are being summed up, we hear in many instances expressions of satisfaction, the sum total being generally in excess of previous anticipations. There are few changes in lists or discounts to report, although there will doubtless be a good deal of revision during the opening of 1875. The feeling in the market with regard to the future is more cheerful than we have noticed it in some time.

Trade in Foreign Hardware is quiet, and we hear of no changes in prices. Van Wirt & McCoy will remove from their old stand, No. 43 Chambers street, to 134 and 136 Duane street, near Church street, on the 1st proximo.

There is still a fair demand for Nails, and the market is a firm one at $3·50 for 10d. in lots of 100 kegs and under. As we stated last week, this figure would be shaded for a large order. We find the following in this morning's *Herald*.

WHITEHALL, N. Y., Dec. 15, 1874.

A large and very destructive fire occurred at Au Sable Forks this morning, consuming the nail factory, rolling mill and machine shops, and all the buildings on the south side of the Au Sable River belonging to J. & J. Rogers' Iron Company. The loss is about $125,000, partially insured.

This mill employed forty-six Nail machines, equivalent to a capacity of about 75,000 kegs annually.

J. Clark Wilson & Co., agents for the Taylor Mfg. Co., have in stock a fine assortment of their Russian Sleigh Bells, which they offer to the trade at the following list, less discount 25 per cent. An illustration of these goods will be found in their advertisement on the 20th page.

FOR SINGLE HARNESS.

	Per doz.
No. 80, Polished Bells, Japanned Bow	$30·00
No. 81, Silver Plated Bells, "	40·00
No. 82, " " Silver Plated Bow	60·00
No. 83, Gold Plated Bells, " "	75·00
No. 84, " " Gold Plated Bow	90·00
No. 85, Nickel Plated Bells, Nickel Plated Bow	60·00
No. 86, Polished Bells, Polished Bow	45·00

Quackenbush, Townsend & Co., Nos. 59 and 61 Reade street, have purchased from "the Challenge Spring Company" their machinery, patterns, etc., and are now engaged in manufacturing these widely known and very popular Door and Gate Springs. The increased facilities possessed by this old established house enable them to still further reduce the prices of these goods, as will be seen from the revised price list given below:

STANDARD STYLES.	List of Japan'd, per doz.
No. 9.—For Wire Netting, Office and Light Inside Doors	$4·00
No. 7.—For House Doors and Cottage Gates	5·00
No. 6.—For Store Doors and Heavy Gates	6·00

Discount on Japanned, 40 per cent., net cash.
Packed in boxes of one dozen each.
Coppered.—$1.25 per dozen advance on net price.
Galvanized.—$1 per dozen advance on net price.
Nickel Plated.—No. 9 and 7, $2·50. No. 6, $3 per dozen advance on net price.

We invite the attention of our readers to the advertisement on page 23 of Blakemore's Gravity Alarm Door Bell. This Bell was patented Dec. 23, 1873, and has only very recently been introduced to the trade. It is simple in construction, well finished, and contains nothing at all liable to get out of order. Its operation is described by the manufacturer as follows:

Being operated solely by gravity, and having no springs—as all others have—it is less liable to breakage, and the sound, while distinct, is not startling as that produced by a bell operated by a spring.

It is so constructed that it will strike upon the door being opened an inch, and is therefore superior as a burglar alarm, as most other bells admit of the introduction of a stick or other instrument to prevent their giving an alarm.

When it is not desired to use the bell, it requires but a simple movement to prevent its striking, the crank being reversible from the inside by a slight touch.

The following is the list, which is subject to a discount of 40 per cent.

In Polished Bell Metal.

4 inch	per doz., $18·00
5 "	" 25·00
6 "	" 36·00

In Bronzed Steel.

4 inch	per doz., $10·50
5 "	" 14·00
6 "	" 19·00

These goods are manufactured by F. Blakemore, No. 3425 Market street, Philadelphia. J. Clark Wilson & Co. are the agents in this city.

Aberdroth Brothers, Nos. 109 and 111 Beekman and 282 Pearl streets, have issued the following revised discount sheet for Plumbers' Iron Ware, showing important reductions on previous figures:

On Iron Pipe and Pipe Fittings, from 2 inch to 6 inch inclusive	dis. 55⅓
On Iron Pipe and Pipe Fittings, from 7 inch to 12 inch, inclusive	50⅓
On Plain Iron Sinks, from No. 1 to No. 4, inclusive	50⅓
On all Wash Stands—Plain, Galv'd and Enameled	30⅓
On Privy Sinks, Bath Tubs, Tanks and Plumbers' Furnaces	20⅓
On Stable Furniture	25⅓
On Hopper Traps, and all other Plain, Enameled and Galv'd Ware not enumerated above	40⅓
Enameled Phila. Hoppers	$1·30 each Net Cash.
Enameled Phila. Hoppers, in lots of 100	1·25 " "

The Sprague Can Opener, which is very clearly illustrated in advertisement on the 24th page, is in every way worthy the consideration of the trade. Its construction, which is a model of simplicity, is on the principle of an ordinary shears. This tool will cut equally well on a straight line or circle; it shears clean, leaving no ragged edges, is easily operated, and contains in its construction nothing complicated or liable to get out of order. It is placed upon the market at a low price. The manufacturers claim for it that it is the best as well as the simplest Can Opener made. It is intended for opening all kinds of tin packages, such as fruit and oyster cans, sardines, paints, etc., and is manufactured by the Sprague Can Opener Co., Rochester, N. Y.

Trade in House Furnishing Goods, Tinners' Trimmings, etc., is without new feature. The manufacturers of Tinware held a meeting this afternoon at the Astor House, in this city, but up to the close of business their action had not transpired.

The Hart Bliven & Mead Mfg. Co. have issued the following circular, under date of 15th instant:

CARPENTER'S SQUARES!

One of our people has invented an article of utility, and supplied a want of long standing in the retail Hardware business, viz., a case of convenient form to keep Carpenter's Squares free from dust and dampness, yet always handy and ready to exhibit for sale.

We have applied for Letters Patent, and propose to lend them (not sell) to our patrons so long as they may desire to retain them for the exclusive use of keeping our productions for sale, confidently relying on their honor not to use them for the benefit of our competitors.

We can make them of any material, but have decided to use heavy japanned tin, and letter the cover to show the contents, number, &c., each case holding one quarter dozen.

They will be distributed on conditions hereinabove stated, and as follows:

One case will be loaned with each dozen squares ordered until the dealer shall have received all the several numbers he desires to handle.

We have received the following letter from a gentleman who took part in the meeting of the Western Hardware Association, in Chicago, last October:

CINCINNATI, Dec. 7, 1874.

To the Editor of The Iron Age: Editorials and communications in *The Iron Age* attempt to belittle the action of the Western Hardware Convention. They speak derogatory of the mental capacity shown there, and the motives of self-interest guiding that body in its resolutions. An impartial observer, however, will see clearly that parties fathering these communications have an axe of their own to grind, and that the self-interest attributed solely to that stupid set of men gathered at Chicago, should first be weeded out of their own soil, where it exhibits itself in full bloom, before the same is shown up as the great sin of that Convention.

Let us, however, candidly admit, what our opponents seem unwilling to do, that protection to our interests was the main spring to move and model our actions. And where, I ask, lies the injustice of any branch of the mercantile body seeking to improve by fair means their condition, and protect their interests? I start with the assertion that the manufacturer of hardware cannot distribute his products without the jobber in the interior cities. It is he who reaches thousands of avenues, the by and cross roads; it is he who is needed scarcely less in the large towns along railroads by the hardware men who, from the limited trade they command, cannot order the thousand and one articles from just so many manufacturers. It is the jobber who collects the almost countless variety of goods from the different manufacturers in one complete stock, and distributes each and every article to the retailer as needed, and in such small quantities as no manufacturer at a distance could well pack and ship. I say, therefore, the jobber is a necessity for the manufacturer, and not less for the retailer.

Do away with the jobbers, and in their place must spring up in every city manufacturers' agents, who sell and carry the stock on commission at the risk of the manufacturers. Hence it is for the manufacturers to consider: Is it to their interest to make positive large sales to the jobber for cash, as is done now in most cases, and dispense with all risks of declines, of carrying dead stock, or other eventualities, or employ agents for a commission, and assume themselves all the risks? I think they will uniformly decide on selling to the jobber rather than employ an agent. Assuming this to be correct, I ask, is the jobber not entitled to a legitimate protection from the manufacturer? and wherein did the convention try to obtain that protection? Did it ask the manufacturer not to sell to the retailer? No! Did it make any other unreasonable demand? No! All its resolutions simply went to bring about a needed reform, viz: that manufacturers shall not send broad-cast, by circular or publication in the papers, the prices we pay them for their goods.

To inform our trade of the prices we pay necessarily leads to demoralization, as long as our customers cannot realize the expense and loss of conducting a jobbing business. The hardware convention of Chicago did not, as stated in *The Iron Age*, desire to have the market reports of New York suppressed. The jobbers of the West are ready and willing to compete on fair terms with the jobbers of Eastern cities, but must consider it unfair, to a high degree, and derogatory to their interests, that manufacturers should publish their wholesale prices.

The sale of all descriptions of Hardware by lists and discounts, when the same are circulated by manufacturers *or* jobbers, has proved a most pernicious practice, the more as a large part of our business is done by traveling agents, affording them, with the quotations of competitors everywhere before them, a constant opportunity for cutting prices, and demoralizing the business.

The request of the Western Hardware Association, that the manufacturers should discontinue, *as far as practicable*, this system, cannot be considered as unjust, inasmuch as the jobbers imposed upon themselves the very same restrictions.

The Convention made no threats against those not complying with their *request*, but simply gave expression to a natural feeling of imperfect human nature, that we will give preference to those manufacturers who comply, not with our dictations, but with our request. If others are more charitable than this, don't let them hide their light under a bushel, but let it shine brightly and become the subject of our admiration. DELEGATE.

In reply to the above letter we have only a word or two to say. We do not think that any of our correspondents, or ourselves, in commenting on the action of this association, have attributed to the members any other motive than that stated to be the true one by "Delegate." The desire to advance their own pecuniary interests is the only one likely to cause either jobbers or manufacturers to make a combination. The only question is whether it is to the interest of the other portions of the trade that their scheme should succeed. We think there can be no doubt, despite the disclaimer of "Delegate," that the gentlemen who in a formal resolution request the manufacturers "to discontinue, as far as practicable, the use of all lists and discounts and printed quotations, either by circular or publication in papers," *do* "desire to have the market reports of New York suppressed." We do not think they will be able to effect this change in the methods of doing business which have prevailed since the foundation of the trade, and we cannot commend their wisdom in attempting it.

We have received the following letter from a retailer in Iowa:

IOWA, Dec. 9, 1874.

To the Editor of The Iron Age: It is with deep interest that I notice the present aspect of affairs in hardware circles, and as the *Manufacturer* and *Jobber* have given their views through your columns, I think it fair that the *Retailer*, also, should have a "put in," as he certainly bears a very important relation to both manufacturer and jobber.

Now, from where I look at the situation, the *present* policy of the "Western Hardware Association" is *certain suicide to themselves*, and ruin to many retailers, for when they "discontinue the publication of prices" the retailer will be thrown completely upon their "tender mercies," and instead of the *present* safe and economical way of buying only what he needs, and in small quantities, he must go to market and "lay in a stock," in which case he will, as a matter of course, go to New York and other Eastern cities, *the Western jobber losing all the custom worth having.*

The "W. H. A." reminds me of the hen that undertook the hatching of 4 dozen eggs, for when they seek to *intimidate* the manufacturer, and *hoodwink* the retailer, in fact levying a royalty on all Hardware consumed, and assuming absolute control of *both* ends of the bargain, like the hen, they have too big a job on hand. If such is not the case, Eastern manufacturers will have to have more "sand" than most of our Western men, to resist the temptation, when a Western man tenders him the "ready cash" to refuse him goods at good figures, for he can safely reason to himself, if *I* don't take that money some *other* man *will*.

Yours, truly, RETAILER.

We have also received the following:

To the Editor of The Iron Age: A correspondent in your journal has recently referred to the heavy expenses incurred by jobbers of hardware in the sale of goods by commercial travelers; therefore, I suggest that proprietors of our manufacturing establishments and commercial houses take a trip or two in their own interests, and learn the abuses that exist in the system, and know how it is themselves.

If none but legitimate and necessary expenses of traveling were reported and paid, there would be less objection to the system on account of the cost of selling goods in this popular way.

It is not contemplated by the capitalist to make his salesmen's visits to his customers pleasure trips; but by abuse it has drifted into such, and the expenses on the road have nearly doubled in consequence.

The young salesman starts out with no idea but to travel economically, and push his employer's interest in the sale of goods, but he falls in with other salesmen, who demoralize him almost at the very commencement of his business, and in traveling together they double the consumption of luxuries in the way of food—also of cigars and drinks, and when in large villages or towns they work off the dull evenings in billiards, and other amusements less reputable, at the expense of the business, and report the cost under the general head of "entertaining customers."

If this practice continues it will soon, under small margins of profits, break up the whole system; or, in place of salaried salesmen, we shall have only men who are paid a commission on sales actually made by them on the road. Such salesmen are not desirable for several reasons, one of which is sufficient to name—*i. e.*, conflicting interests between employe and employer.

The salesman who sells on commission surely looks out for number one. Anticipating a trip, he obtains as many free passes as possible on the *false plea* of being able to influence the route by which the goods he is about to sell shall be transported. He dines moderately, smokes and drinks reasonably, saves carriage hire when possible, and finds the good old-fashioned cars—where business acquaintances are made—quite as convenient, by day, as the Pulman and Wagner palace cars.

The legitimate and necessary expenses are as follows: Breakfast, dinner, supper, and lodging, each 50 cents, makes $2 per day; railroad fare (except in the Southern States) averages 3 cents per mile, call the distance traveled 66⅔ miles per day, makes $2 more, or say $4, as the unavoidable daily expenses of the traveler. I consider another dollar a liberal allowance for stage or street car rides, porterage, etc., and that if any greater sum is returned as expended, it should be reported in detail, and employes brought to a sense of their obligations to their employers.

I am not unfriendly to commercial travelers, nor unmindful of the hardships of the faithful worker, nor of the temptations and evil influence of the "old soakers" which continually beset the young man who cannot choose his associates on the road; but I desire to remind young salesmen that their interests are best promoted by industriously and economically pursuing their vocations until their services become indispensable to their employers; then, and not until then, will they be fitted for promotion in the business in which they are engaged, or for other business on their own account. EX-COMMERCIAL TRAVELER.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Dec. 16, 1874.

Scotch Pig.—The market is dull, with little demand. Prices are steady and unchanged at last week's quotations, with the exception of Eglinton, which has fallen off 1/, and is now quoted 85/6.

Manufactured Iron.—The market rules dull, with a declining demand and weaker prices. There is but little doing. Best Staffordshire Bars are nominally £9. 15/ @ £10. 10/.

Rails.—There is no demand for Rails, and prices are weak and nominal.

IRON.

American Pig.—The market is in much the same condition as when last reported. Some of the companies continue to quote $26 for No. 1 Foundry, but enough good Iron can be had for $25 to fill all the demand. The Thomas Iron Company report the sale of 1200 tons No. 1 Foundry, in lots, at $25. We also hear of the sale of 1000 tons Lehigh Iron Company's Gray Forge at $19, at works. Except in a small way, there are not many sales, as buyers do not seem anxious to avail themselves of present rates, low as they are. On the other hand, manufacturers are not, so far as we can see, willing to contract far ahead at present prices, which, for most of the furnaces, are below actual cost, without allowing anything for interest on their capital. We quote No. 1 Foundry, $25 @ $26; No. 2 Foundry, $23 @ $24; Gray Forge, $21 @ $23.

Scotch Pig.—The stock here is very small, consisting of Coltness, Glengarnock and Eglinton. The demand, however, is light. We quote: Coltness, $40 @ $41; Glengarnock, $37; Eglinton, $36.

Rails.—We hear of no transactions, and the mills are in decided want of orders. The best American Rails can now be bought at $50 at works. Steel Rails are quoted $80. Welsh are nominally $47 @ $50, gold.

Old Rails.—We note the sale of 1600 tons in the West at $30, short time and interest. We quote here $28·50 @ $30.

Scrap.—We quote $28 @ $30, with no sales reported. Some is offered at $28, while more is held at $30.

We have received the following telegram, dated at Pittsburgh, this afternoon:

At a meeting of Iron manufacturers, yesterday, it was agreed to reduce the card to 2½ cents. At the last conference between the manufacturers and the puddlers, the latter offered to drop the card down to 2¼, but the former then refused. Whether the puddlers will accept the situation, now that the card has been reduced, remains to be seen.

METALS.

Copper.—Sales for the week sum up between 300,000 and 400,000 pounds Lake on the spot at 23¼c. Dealers are selling at 23⅜c. Baltimore Copper may be quoted from 22¾c. to 23c., nominally. Nothing has transpired in Lake futures; the asking price for January and February delivery is 24c., for February and April, 24⅛c. A quiet tone has prevailed throughout, and we expect no change in this respect till after the holidays. The same thing is repeated every year, consumers not wishing to increase their supplies while they are taking stock and preparing for the new season, which opens in January. As a whole, the position of the metal remains a good one, both here and in Europe. That a higher discount in England would unfavorably influence the price of Chili Bars, after they had gradually run up from £73 to £89, was to be expected; the more so as the Chilean charters were sure to have been stimulated by the extraordinary rise, while the latter remained unchecked. The decline now taking place in England will bring a new set of purchasers into the market, and even supposing that Chili Bars drop to £82, which is not unlikely, the subsequent rebound will be all the more vigorous. The latest quotation per cable received here quotes Chili Bars £85, which they stood already on Friday, last week, when Best Selected simultaneously commanded £96. Now that the Argentine revolution is officially announced to have ended, the cable between Valparaiso and London through that republic will, we presume, be promptly repaired, and England will be regularly posted once more as regards the fortnightly Chilean export movements. The manufactures of Copper are, meanwhile, well sustained. We quote New Sheathing, 28c., and Bolts and Braziers, 30c.; Bronze and Yellow Metal Sheathing, 21c. @ 22c., and Yellow Metal Bolts, 28c., net cash.

Tin.—Sales of the week about 1700 slabs Straits at 22c. @ 22¼c., gold, on the spot and to arrive. Stocks of all kinds are comparatively small, and there is now nothing unsold on the way. Hence the market is strong, with 23c., gold, asked for Straits by dealers for lots of 50 to 100 slabs. We at the same time quote English Common, 21⅝c.; do. Refined, 22c., and Banca, 26c., all gold. The latest quotation per cable from London, to hand a day or two ago, was £98 for Straits, against £92. 10/ on Saturday, when it was reported to be quiet and moderately active. Singapore on Saturday cabled New York parity 21¾c., gold, per lb., while yesterday the quotation thence came $25·12½ per picul, and from Penang, $25. As the metal stands, it commands confidence on both sides of the water, less so, perhaps, on the strength of its statistical position, so far as Europe is concerned, than on account of its real cheapness, being by a great deal the cheapest metal on the list. The late Dutch sale made Banca Tin stand at £102 at London, and the English remark in their reports of the 28th November, not without reason, that, compared to Banca, Straits and English Tin is cheap. What we say with respect to the low price, therefore, more particularly refers to the last named two kinds. A brisk beginning early next year, both here and in Europe, would turn speculation upon Tin in preference, we believe, and this is the impression prevalent at New York. Tin Plates remain quite strong, although they have quieted down since the late movement. Sales have been altogether of a jobbing character, and sum up 5000 boxes at well sustained prices. Some of the people in the trade seem to be of opinion that the whole movement was premature and too artificial, and pretend to say that it is *not* backed up by a bona fide demand from *consumers*. However this may be the market closes firm at the following quotations: I. C. Charcoal, $9·75 @ $9·87½, gold, per box; Charcoal Terne $8·62½ @ $8·75; I. C. Coke, $7·75 @ $7·87½, and Coke Terne, $7·00 @ $7·25. We are now waiting for the mails from England to hear all about the real extent of the transactions for American account. We only know that the general English improvement was three shillings per box.

Lead.—The market for Domestic has been as dull as heretofore, the entire sales not exceeding 80 tons, which included an outside lot of 40 tons sold at 6·15c., gold, the balance going at 6·20c. gold. The latter figure is the present quotable value, while the government and the Selby people continue to hold at their old asking rate of 6·35c., gold. Of Selby another 200 tons have arrived and gone into store. There is no Foreign here except 35 tons of an old importation. Nothing transpired therein, and we nominally quote the same 6¾c., gold, and no more. There is nothing of particular interest from Europe, except that the arrivals at Marseilles were heavier, from which the inference may be drawn that Spain recommences to export more liberally. Manufactures of Lead are steady at 8¾c., less 10 per cent.

Spelter and Zinc.—Nothing has been done in either Foreign or Domestic Spelter. No later news came to hand, either by mail or telegraph. We quote, nominally, Foreign from 6¼c. @ 7¼c., gold, for Silesian, and Missouri Domestic, 6⅝c. @ 6¾c., currency. We expect no revival in this metal till about the middle of January next, consumers preferring to work up old stock ere they acquire any fresh supply, as is always the case toward the close of the year. Sheet Zinc is firm at 9½c. @ 9⅝c., gold, for 9 by 36; other sizes at 9c. @ 9¼c., gold.

Antimony.—London, per telegraph, remains unaltered at £51. We are quiet here at 12½c., gold.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending December 15, 1874:

Hardware.

Boker Hermann & Co.
Mdse. pkgs., 2
Per. caps, cs., 10
Packages, 4
Cases, 7
Casks, 2
Degraw, Aymar & Co.
Chains, cks., 2
Chains, lengths, 6
Falconer J. M.
Casks, 1
Field A. & Co.
Casks, 1
Cases, 10
Chains, cks., 10
Frognatt Edwin,
Guns, cs., 2
Frasse P. A. & Co.
Casks, 3
Goodwin R. L. & Son,
Wire, cks., 1
Heinze Otto,
Casks, 1
Hildick A. H.
Chains, cks., 13
Chains, pcs., 1
Hilger E. & Sons,
Casks, 1
King, Briggs & Co.
Chains, cks., 12
Lau & Garlichs,
Mdse. pkgs., 4
Arms, cs., 4
Laughland & Co.
Wire, cks., 9
Wire, bdls., 1
Mills N. & Co.
Packages, 2
Sawyer John,
Wire rope, coils, 2
Schoverling & Daly,
Cases, 5
Shattuck & Binger.
Casks, 1
Strauss L. & Sons,
Cutlery, cs., 1
Van Wart & McCoy,
Cases, 1
Woolsey T. S.
Files, 71
Wiebusch F.
Anvils, 145
Casks, 7
Order.
Casks, 4
Cases, 4

Iron.

Bellows F. W. G.
Scrap, tons, 37
Crocker Bros.
Pig, tons, 12
Dowley, Corners & Co.
Tons, 7
Foulke Theo.
Scrap, lbs., 4000
Henderson Bros.
Pig, tons, 100
Laughland & Co.
Hay bands, bdls., 600
Lang W. Bailey & Co.
Bars, 364
Phelps, Dodge & Co.
Sheet, pkgs., 250
Seligman J. & W.
Spiegel, cks., 330
Van Wart & McCoy,
Sheet, bdls., 450
Order.
Cases, 41
Bars, 8596
Bundles, 430
Scrap, cs., 587

Steel.

Barton, Alexander & Waller,
Spring, cs., 5
Hogan John,
Bessemer bars, bdls., 6
Bars, 32
Cases, 16
Casks, 2
Hugill Chas.
Cases, 1
Bundles, 29
Prosser Thos. & Son,
Forgings, 24
Sanderson Geo. & Co.
Casks, 13
West, Bradley & Cary,
Bundles, 42
Order.
Bundles, 891
Wire rods, cast, bdls., 236
Wire rods, Bessemer, 130

Metals.

Bruce & Cook,
Tin ingots, 300
Byrne Joseph & Co.
Tin plates, bxs., 755
Baring Bros. & Co.
Lead, pigs, 1800
Haxtum R.
Lead, pigs, 4000
Leaycraft & Co.
Scrap copper, pkgs., 4
Scrap, lead, pkgs., 2
Scrap, brass, pkgs., 7
Pacific Mail S. S. Co.
Scrap, zinc, pkgs, 58
Phelps, Dodge & Co.
Tin, ingots, 1817
Tin plates, bxs., 23,776
Antimony, cks., 120
Windmuller L. & Roelker
Zinc, cks., 20
Yates & Porterfield,
Scrap, copper, bbls., 12
Order.
Tin plates, bxs., 3302

COAL.

The retail trade toward the close of the week has been more active than for some time past, in consequence of the change in the weather, and as their stocks are very light, a better city demand is expected. For several days past there have been various rumors to the effect that the large Coal companies of the Luzerne region were contemplating a cessation of operations, and that a general suspension of Coal mining would take effect on the first of next January. Such a step was at one time contemplated, but there is no fear of its going into effect. The Pennsylvania Coal Company, instead of suspending work, have decided to run their mines on three-quarter time, and the other collieries will continue working on half or three-quarter time throughout the winter. The prospect is not so gloomy after all, and with fair economy and judicious management, the people of that section of the State need have no apprehensions of distress or destitution.

A Coal trade journal says: "The re-adjustment of wages, and a consequent long suspension, appears inevitable; rumor has it that the Anthracite companies will want a 25 per cent. reduction in wages. Transportation should also be reduced, and the opening rates for 1875 be less by 50c. per ton than last spring, and not advance over 50 cents during the season."

We quote as follows: Cumberland, $6·25 @ $6·75; West Virginia, $7·25; James River Steam, $6·25; James River Carbonite, $9; Kanawha House, $14·25; American Cannel, $13; Pennsylvania and Westmoreland, $7·65; Murphy Run, $7·40; Newburg Orrel, $7·50; Sterling Ohio, $12; Liverpool House Cannel, $17 @ $18; Liverpool Gas, $10; Newcastle Gas, $7·50 @ $8; Scotch, $9; Ince Hall, $17 @ $18.

The following are the prices charged by the Lehigh and Wilkesbarre Coal Company for Coal, deliverable f. o. b. at Port Johnston, N. J., during the month of December:

	Lamp.	Steamer.	Broken.	Egg.	Stove.	Chestn't.	Pea.
	$	$	$	$	$	$	$
Old Co.'s Summit	6 50	....	6 45	6 45	6 60	5 65	4 00
" Room Run	6 00	....	6 00	6 00	6 35	5 35	4 00
Honey-Brook Lehigh	6 35	....	6 30	6 30	6 45	5 50	4 00
Spring-Brook do	6 35	....	6 30	6 30	6 45	5 50	4 00
Wilkesbarre	5 55	5 65	5 75	5 90	6 45	5 35	4 00
Plymouth Red-Ash	....	....	5 75	5 90	6 50	5 35	4 00

The following are the prices in gold for Nova Scotia Coals, delivered at the shipping points for the month of December:

Block House	$2·25	Pictou	$2·50
Gowrie	2·25	Little Glace Bay	2·00
Lingan	2·25	Caledonia	1·90
Sydney	2·50	Slack from 75 to 80 cents.	

Freights to New York, $3·75 to $4; to Boston, $3·75. Duty 75c. per ton, gold.

The fiscal year of the Philadelphia and Reading Railroad closed on the 30th of November. The following is the total coal tonnage shipped during the year in comparison with 1873:

	Tons.
Railroad in 1873	6,546,553
" 1874	6,348,812
Decrease in 1874	197,741
Tonnage of canal in 1873	743,796
" " 1874	717,510
Decrease in 1874, tons	26,286

Making a decrease in the tonnage for the year on railroad and canal, 224,030 tons.

The complete report of the Coal tonnage of the Lehigh Valley Railroad foots up as follows, compared with last year:

	Tons.
Received from Wyoming Region at Maunch Chunk	1,046,967
Received from Hazleton	1,986,480
" Upper Lehigh	4,733
" Beaver Meadow	631,631
" Mahanoy	475,604
" Mauch Chunk	5,245
Total in 1874	4,150,660
Total in 1873	4,144,340
Increase in 1874	6,320

OLD METALS, PAPER STOCK, &c.

We have no perceptible improvement to report in the condition of this market since last week. Business still continues very dull, and our quotations remain without change. During the past week some dealers have disposed of their accumulations of Cast Iron at ¾ cents a pound, which is somewhat lower than the regular market price. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 4c.; Zinc, 4½c. @ 5c.; Pewter, No. 1, 19c.; do., No. 2, 8c. @ 12c.; Spelter, 5c. @ 5½c., Wrought Iron, 1¼c.; Sheet do., ½c.; Cast, do., ½c. @ ¾c.; Machinery, do., ¾c.

Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No 1, 6c. @ 6¼c.; No. 2, 2½c.; White, No. 1, 6c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gunny Bagging, 1c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2c. @ 2½c.

PITTSBURGH.

PITTSBURGH, Dec. 14, 1874.

PIG IRON.—There has been little or nothing done in Pig during the past week, excepting some few small sales of Foundry Iron, and no improvement can reasonably be expected as long as the "lock-out" holds out. The mills bought just as little as they could possibly help before the "lock-out" was inaugurated, and it is not to be expected that they will stock up now, with their puddling furnaces idle, unless the price gets low enough to make it an object. While it is true that Pig—I refer now to standard Forge Irons—is from $1·50 to $2 per ton lower than it has been at any time since the panic, and very much lower than at any time since before the war, the indications just now are that it will go still lower—that shrinkage will continue, and the outlook is any thing but encouraging for the producing interest. The only redeeming feature apparent is that it may tend to curtail production, as, notwithstanding a large percentage of the furnaces immediately tributary to this market are out of blast, there is no question but that the production is, and has been all along, in excess of the consumption, and stocks have been, and are still, steadily accumulating. There has been an increased activity in Muck Bar, sales of 1200 to 1500 tons having been reported this week at prices ranging from $39 to $43, cash. It is alleged—I do not vouch for its correctness—that the mills can import Muck Bar from other points, with freight and other expenses added, cheaper than they can make it. The report comes from Youngstown, Ohio, that the puddlers there have notified the mill owners that unless they stop shipping Muck Bar to the mills here they will strike. However, some of our mills—doubtless in anticipation of a strike—accumulated considerable Muck Bar, and these will be enabled to run on for from thirty to 60 days, even if there should be an embargo placed on importations from abroad.

MANUFACTURED IRON.—The situation as regards Finished Irons remains substantially as noted in my last report. Orders are coming in sparingly, as is nearly always the case at this season of the year, and while, with one or two exceptions, the mills are still in operation, as a rule they are working short time. Prices continue weak, but unsettled and irregular, and it is impossible to give accurate quotations. There is a possibility that the curtailment of the production, taken in connection with the fact that stocks, both in first and second hands, are small, may stiffen up the market, although the indications generally are not favorable for any material or permanent advance in prices.

STEEL.—There is no improvement to note in the demand, and it is not likely that there will be until the spring trade opens up, about the latter part of next month. Some of the mills are still reported running full, while others are working short time. Prices continue weak, and as there is an active competition buyers have the advantage.

NAILS.—Trade continues dull, as it nearly always is at this season of the year, and no improvement is expected until the latter part of next month, when the spring trade usually commences to open up. Prices are weak, but $3·35, 60 days, still appears to be regarded as the ruling rate, in a jobbing way, with the usual discount of 2 per cent. for cash.

SCRAP IRON.—There is little that is new to report in regard to the Scrap trade. It is possible the lock-out may improve the demand, but it has had little or no influence as yet. The receipts continue small, and the stock must of necessity be considerably reduced, but there is but little inquiry and prices are nominal.

WINDOW GLASS.—Trade in this important Pittsburgh interest is holding up well for this season of the year, but manufacturers complain that prices have been run down so low that there is little or no margin—some of them claim that they are losing money. Discounts off Pittsburgh list are quoted at 65 to 70 per cent.

THE LOCK-OUT.—There has been no change in the position of the lock-out during the past week. As noted in my last report, over 800 out of the 850 furnaces here and hereabouts have blown out, and the balance will shut down shortly, unless the puddlers consent to continue work at the reduction, which is not likely. With the exception of the puddling furnaces, the mills generally are still in operation, some of them having accumulated a good stock of muck bar prior to the strike, but the most of them are working single turn. The probability is that the lock-out will continue until next month, as the mills usually stop a couple of weeks in January to take stock and make repairs, and it is doubtful whether the mills would care to start up their puddling furnaces before that time, even if the puddlers would consent to the reduction.

The Pittsburgh *Commercial*, of the 12th inst., says: By reference to our report below it will be seen that little Pig Iron has changed hands during the past week, and we cannot expect any demand while the lock-out of the puddlers continues. Sales of Muck Bar amounting to near 2000 tons have been made, but they are mainly to mill firms who had none on hand, and required some to complete orders which had to be filled. It is not supposed that the Bar Iron manufacturers would buy any considerable quantity at prices now asked for it, with which to fill orders for bars at current market rates. We are reported the following sales:

MUCK BAR.

500 tons muck bar	$41·50—cash.
310 tons muck bar	41·00—4 mos.
300 tons muck bar	42·00—cash.
300 tons muck bar	40·00—cash.
100 tons muck bar	39·00—cash.
100 tons muck bar	43·00—4 mos.
100 tons muck bar	42·00—cash.
100 tons muck bar	42·50—cash.

CHARCOAL.

250 tons Lake Superior	$30·00—cash.
50 tons mill, Hanging Rock	28·00—4 mos.
31 tons No. 1 foundry, Hanging Rock	$31·00 @ $35·00—4 mos.
25 tons No. 1 foundry, Hanging Rock.	34·00—4 mos.

CONNELLSVILLE COKE.

100 tons No. 2 foundry	$24·00—cash.
10 tons No. 2 foundry	25·00—4 mos.

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.

20 tons No. 1 foundry	$28·00—4 mos.
20 tons No. 1 foundry	25·50—cash.
10 tons mill	23·00—4 mos.
10 tons No. 1 foundry	28·00—4 mos.

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Dec. 14, write us as follows: PIG IRON.—The market is dull, and in some cases lower prices have been accepted to affect sales. There is so much irregularity in rates that it is difficult to give accurate quotations, which, for the present, must be considered as nominal. We revise quotations as follows:

HOT BLAST CHARCOAL.

Hanging Rock No. 1 ℔ ton	$29·00 @ 30·00—4 mos.
" " No. 2	26·00 @ 27·00—4 mos.
" " Forge	24·00 @ 25·00—4 mos.
Tennessee No. 1	28·00 @ 29·00—4 mos.
" Forge	24·00 @ 25·00—4 mos.
Alabama No. 1	28·00 @ 29·00—4 mos.
Missouri No. 1	29·00 @ 30·00—4 mos.
" No. 2	26·00 @ 27·00—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1 ℔ ton	$28·00 @ 29·00—4 mos.
" Forge	26·00 @ ....—4 mos
Ohio No. 1	26·00 @ 28·00—4 mos.
" Forge	24·00 @ ....—4 mos.
Scotch Pig, No. 1	26·00 @ 28·00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ℔ tu.	$35·00 @ 50·00—4 mos.
Missouri " "	43·00 @ 45·00—4 mos.
Kentucky " "	40·00 @ 42·00—4 mos.
Tennessee " "	36·00 @ 42·00—4 mos.
Georgia " "	40·00 @ 42·00—4 mos.
Alabama " "	40·00 @ 42·00—4 mos.
Machinery and Forge	40·00 @ 42·00—4 mos
Blooms	70·00 @ 90·00—4 mos.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Dec. 14, writes us as follows: The market is dull and lower. Purchasers continue to confine their purchases to what they have immediate use for. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$28·00 @ 30·00
" 2 " " " "	26·00 @ 27·00
" 1 Forge, " " "	24·00 @ 25·00
" 1 F'dry, from Tennessee Ores	26·00 @ 28·00
" 2 " " "	25 00 @ 26·00
" 1 Forge, " "	24·00 @ 25·00
" 1 F'dry, from Alabama Ores	26·00 @ 28·00
" 1 " " Iron Mountain Ores	28·00 @ 30·00

HOT BLAST STONE COAL.

No. 1 F dry, from Missouri Ores	29·00 @ 30·00
" 2 " " "	28·00 @ 29·00
" 1 Forge, " " "	27·00 @ 28·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	40·00 @ 50·00
" " Tennessee Ores	36·00 @ 38·00
" " Alabama Ores	40·00 @ 42·00
" " Georgia Ores	40·00 @ 42·00
" " Missouri Ores	40·00 @ 42·00
" " Kentucky	30·00 @ 42·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of Dec. 15: The market rules dull and depressed, and sellers are compelled to submit to concessions to effect sales. We quote the list shaded and weak.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	2·8-10 to 3 cts. per lb.
1 to 4¾ wide by 1⅜ to 2 thick	
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2 8-10 to 2c.
Hoop Iron, 1¾ wide and upward	4¾ to 4¾c.
Band Iron, from 1¾ to 4 in. wide	3¾ to 4¼c.
Horse Shoe Iron ¾ to 1 wide by ⅜ to ⅝ thick	4½ to 5c.
Norway Nail Rods	7¾ to 8¼c.
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16¼c.
Machinery Steel	11¾c.
Cast Spring Steel	10¾c.
Homogeneous Steel Plate	13c.
Perkins' Horse Shoes, per keg of 100 lbs.	$5·87½
" Mule Shoes " "	6·87½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per lb.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per lb.

R. R. Spikes.....5½ by 9-16 at 3¼c to 4c. per lb.

Messrs. HOFFMAN, THOMPSON & Co., Iron commission merchants, 23 and 25 South Frederick street, under date of Dec. 15, report the Pig Iron market as follows: Charcoal Irons have taken another step downward, caused principally by a pressure to sell when there was no market, which accomplished nothing but lower quotations. Anthracites are without change and weak.

Baltimore Charcoal Pig Iron	$32·00 @ 35·00
Virginia " "	32·00 @ 35·00
Alabama " "	30·00 @ 32·00
Anthracite No. 1	27·00 @ 28·00
" No. 2	26·00 @ 27·00
" No. 3	23·00 @ 25·00
White and Mottled	17·00 @ 20·00

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, Nov. 29, 1874.—*Metals.*—The general European Metal markets have not been as active during the week under review as was the case the preceding one. Little change in quotations is noticeable; prices have been steady, despite the reduced volume of transactions. We augur well from this, holders evidently having a favorable opinion of the future. *Copper.*—The general tone of the European Copper markets, and especially the English markets, has been devoid of animation. There was no pressure, but consumers took less than during previous weeks. This apathy is in some measure due to the absence of later telegraphic news from Valparaiso. We may now, however, look forward to telegrams giving particulars of charters up to a fortnight ago. All cargoes afloat for England from Chili, with the exception of one, have now been disposed of, while actual stocks in England begin to run low. We hear by telegraph that both the Bombay and Calcutta markets are looking up. A good deal of curiosity is felt in Copper circles, both in England and here, as to the figure that may have been reached at Valparaiso in response to the late rise in Europe. Very little has transpired in Copper here in the absence of Valparaiso telegrams; prices are not as firmly held as was previously the case. Stocks are, however, considerably reduced, and with the least revival in the consumptive demand we may expect a higher ruling. We quote as follows, deliverable at Havre: Chili Bars, 230 francs; Common ditto, 227·50; Ingots, 240; English Tough Cake, 237·50; and pure Corocoro Ore, 227·50. There is no change of note observable at Hzvre, where the market preserves a quiet attitude. Quotations there follow closely the English ones. Copper is well in hand at Marseilles on the basis of 230 francs Refined Ingots. *Tin.*—With the exception of our own, more strength has been imparted to the remaining Continental as well as the English markets, by the rather favorable result of the Dutch sale, laying down Banca, at London, at the comparatively high cost of £101. 10/. At this rate there seems to be room for other descriptions to improve, hence the better feeling. There seems to be little apprehension at present of any material recoil; on the contrary, the outlook is more hopeful. We have, nevertheless, not stood our ground with this metal here at Paris, and have to mark down quotations a trifle. We quote Banca, deliverable at either Havre or Paris, 260 francs; Straits, 245, and English, at either Havre or Rouen, 245. Marseilles is also weaker, large arrivals being about due there of both Straits and Billiton, which descriptions are now obtainable at 240 francs. *Lead.*—This metal continues firm, with an upward tendency in the leading markets, English Soft Pig having improved to £24 at London, on account of short supplies. From the English mining records, alluded to above, we perceive that while Tin production from native ores has slightly increased in 1873, having been 9972 tons of pure Tin against 9560 in 1872, the reverse has been the case with respect to Lead, which yielded but 54,235 tons in 1873, against 60,455 in 1872, a decrease of production of course more severely felt while Spain continues to turn out less than previous to the troubles there. Prices have been well sustained here at 59·25, French Lead, deliverable here; 58, Spanish, at Havre, and 15, German, here. We learn by telegraph from Marseilles that the arrivals there are heavier than they have been for some time past, causing quietness in the market there. As the bulk of this Lead is probably Spanish, it would go to show that the Peninsula resumes operations for export on a more extensive scale. *Spelter* has remained rather quiet on the Continent, but has been a little more active in the London market. Prices have remained quite firm here during the week at 63 francs, Silesian, deliverable at Havre, and 62 for other good brands, at either Havre or Paris. No change at Marseilles. *Iron.*—Nothing of special interest has occurred in the French Iron markets. Prices, with hardly an exception, have kept firm, and the general tendency is rather a promising one. But we are now on the eve of winter, a season not propitious to either large dealings in Iron or the active continuation of work where water-power is used at the north, the streams being frozen most of the time. Fortunately, we are not altogether dependent on water-power. Affinage Pig Iron at Nancy has been but ill sustained, while news comes to us from the Duchy of Luxembourg that it is remarkably firm there. Meurthe and Moselle are steady. We look forward to but little change in values anywhere in France till spring. Coal has been very nearly stagnant here, with a slight giving way.

BELGIUM.

(*Le Commerce.*)

BRUSSELS, Nov. 29, 1874.—*Iron.*—The accounts we have received from the various Iron centers of Belgium during the week are by no means flattering, hardly anything in the way of fresh orders having been done anywhere. Most of the works are filling old orders, and they display little haste in doing so, there being but few later received commands yet untouched, nor is there any very great amelioration expected till spring. Prices find it, of course, difficult to withstand the dullness thus brought about. Plates and Scrap Iron are in most request at present, and remain firm. No. 1 Merchant Iron is steady, most of the Luxembourg furnaces having sold their Pig Iron to be made in '75. Thus that competition, at least, is out of our way. The Maizieres blast furnaces have been lighted. They are situated on the frontier, 60 feet in hight, and capable of turning out 65 tons every 42 hours. They are fully equipped with Cooper-Siemens apparatus, and the latest improvements complete. Minerals will yield 32 per cent., costing but the equivalent of 3/9 per ton. *Coal.*—At length the weather has become colder, and there is a slightly improved prospect, the demand for domestic purposes being on the increase. But the requirements of industry are yet scanty, owing to quiet times in the iron trade; the only inquiry we have from manufacturers is for sugar refining and glass factories. Liege is quiet in expectation of a solution of the Luxembourg duty question. Charleroi and the Center are getting out as much coal as possible, the mines being at a standstill later on during the holidays. Holland seems to consume only German coal from the Ruhr country at present; we have lost a valuable customer there. The prospects in favor of Belgian coal industry are the reverse of brilliant, neighboring nations as well as the English successfully competing with us in our own country. It would seem that at the same rate of extraction we have been indulging in of late years, Belgian coal mines will be exhausted in less than 40 years; this, at least, is the latest estimate of the kind put forward. Our export of coal has, however, decreased 500,000 tons during the first nine months of the present year.

GERMANY.

(*Borsenhalle.*)

HAMBURG, Nov. 26, 1874.—*Metals.*—The German *Copper* markets have been well sustained. The amount of business transacted has been of a trifling nature. *Tin.*—There has been no reaction in a downward sense. We are steady here; Banca at 108 to 110 marks, and English at 106 to 108. *Lead.*—A fresh rise has taken place. German is now worth in this market from 23·75 to 24·10 marks, and English, in blocks, 26·20. Spanish is steady at Stettin at 8¾ to 9 thalers. *Spelter.*—Breslau, after a protracted paralyzation, advises a sale of 1000 quintals at 7¾ thalers, since when it has relapsed into dullness, but remains firms. Nothing has transpired here. We are nominal at 24 marks for Silesian Union.

HOLLAND.

(*Ecers & Co.*)

ROTTERDAM, Nov. 28, 1874.—*Tin.*—The Netherland Trading Society sold the day before yesterday, at Amsterdam, 20,067 slabs Banca Tin at from 57¾ to 58¾ guilders; average, 58·40. In expectation of this auction, the market kept quiet early in the week. Subsequent to the sale some dealings were effected in Banca Tin, cash, at 58·40, and of Billiton sales were made, January and February delivery, at 56.

EAST INDIES.

(*Aitken, Spence & Co.*)

COLOMBO (Ceylon), Nov. 2, 1874.—*Plumbago.*—The market still keeps quiet. Digging operations have not yet been fully resumed, prices offered now not holding out sufficient inducement. Some small demand exists for the United States. No shipments for that destination have as yet been made since the commencement of the season, Oct. 1, against 4294 cwts. last year during the corresponding season. Shipments to the United Kingdom in October, 4706 cwts. We quote, free on board, with commission, exchange at par—Lump, 336; Chip, 189; Dust, 115/6; freight, 75/ per ton. The market closes quiet. *Exchange.*—A slight improvement has taken place during the fortnight. We quote private credits, 1/10¾d.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., Nov. 30, 1874.

THAT RECIPROCITY TREATY AGAIN.

Various sections of the principal manufacturing interests continue to be greatly exercised on the subject of the Canadian reciprocity treaty, and reports of their doings and sayings, during the last week or two, have helped to fill newspaper columns very well. The most noteworthy matter in connection with the matter has been a deputation to Lord Derby. His Lordship (who is, you don't need to be reminded, our Foreign Affairs Minister) received the deputation very cordially, and frankly told them, at the very outset, that he entirely concurred with their views. There was an absolute and entire agreement between himself and the deputation on the question of the duty of the British government being to see that English trade and English manufacturers were not placed at a disadvantage in negotiations such as these. It had never been his intention to allow the imposition of a differential duty in favor of the produce or manufactures of the United States as against our own. The deputation cheered this sentiment vehemently, and his Lordship proceeded to say that he thought that point had been very carefully guarded against, and it was not without surprise that he learned their apprehensions on the subject. If they thought the definition of articles in the schedule was not sufficiently distinct he would be glad to receive their suggestions in writing. There was, however, another side to the question, and that was, that while always protecting the interests of British trade they were bound to look at the peculiar position of Canada, and the relations of Canada with the United States. They were bound to place no unnecessary obstacle in the way of the freest possible commercial relations between the two countries. If they did so it would tend to promote the views and help forward the cause of that small minority of Canadians who look forward to the annexation of Canada with the States of the Union. However, there was nothing in the treaty which would make it possible for the Canadian government to impose a differential duty upon England in favor of the United States. Earl Carnarvon, the Colonial Minister, also addressed the deputation, but his views did not differ from those of his noble colleague and superior. I had also intended to quote a cleverly compiled report on the same subject by Mr. I. Britain, Sheffield, but a lack of space compels me to confine myself to a brief mention of it in another part of this letter.

THE GENERAL STATE OF TRADE

is dull and cheerless as to the immediate future. The outlook is anything but bright in the iron trade proper, and in other branches, such as the Bessemer steel manufacture, there is so much competition that it is believed many of the older houses will endeavor to abandon the trade very shortly. In South Wales and the Northern English iron districts there is much distress, particularly in the North of England, owing to the absence of rail orders—a state of things which the manufacturers are trying to remedy by lowering wages. The men on their side talk desperately about co-operation, and the establishment of iron, &c., works on that principle, but, as their leader, John Kane, of Darlington, reminds them, it is very little use getting workshops and works unless they have customers for their iron or other productions. The same gentleman privately told me, the other day, that he hardly thought it was a good time just now to start co-operative iron works, but the principle was good and ought to be adopted as soon as it could. Thus is the decline of trade gradually becoming more assured and more certain as the year advances; a decline extending to, and affecting nearly every department of, manufacturing industry, but chiefly showing itself in that greatest of British industries, the iron trade.

MINERAL STATISTICS FOR LAST YEAR.

We are clearly improving in these matters. But a few weeks back I had occasion to complain of the very great delay there was in issuing statistics. Now I have to acknowledge that one of our government statisticians has done "wondrous well." This is Mr. Robert Hunt, F. R. S., Keeper of the Mining Records, who has this year got out his statements fully two months earlier than usual. This is as it should be, and is highly creditable to those concerned. I cannot here do more than give an analysis of the broad results at which Mr. Hunt has arrived. All the figures relate to the year 1873—last year—during which it is calculated that the total value of the coal, metals and minerals produced in the United Kingdom was no less than £70,722,992. The coal raised in the year exceeded 127,000,000 tons, of the value of £47,631,280, while the iron ore produced was more than fifteen and a-half million tons, of the value of £7,573,676. The total worth of metals produced from British ores was £21,409,878, and the minerals were worth £1,681,894. Of metals obtained from ores there were 6,566,451 tons of pig iron, 9972 tons of tin, 5240 tons of copper, 54,235 tons of lead, 537,707 ounces of silver, and 4471 tons of zinc. Of the coal raised less than a sixth was used for domestic consumption. Amount exported to foreign countries, 12,712,222 tons; used on railways, 3,790,000 tons; consumed in iron manufactures, 35,119,709 tons; used in smelting other metals, 763,607 tons; used in mines and collieries, 9,500,000 tons; in steam navigation, 3,650,000 tons; for steam power in factories, 27,550,000 tons; in the manufacture of gas, 6,560,000 tons; in water works, 650,000 tons; in the manufacture of pottery, glass, bricks, and in lime and cement kilns, 3,450,000 tons; and in chemical and other manufactures, 3,217,229 tons. The consumption of coal on railways shows an increase of 128,850 tons as compared with that of the previous year, but the number of miles traveled has increased from 190,720,719 to 197,451,216. It may be interesting here to note that the coal used in manufactures is consumed in 4790 cotton, flax, hemp, silk, woolen and worsted factories, running no fewer than 40,650,000 spindles and 549,200 power looms. The returns show that in the coal traffic of the London and Northwestern Company there is an increase of 101,410 tons, though there is a decrease of 283,195 tons in the amount which the company conveyed in Lancashire, and of 37,327 tons in the quantity in Cheshire. In Staffordshire and North and South Wales the increases are substantial. The net Midland increase is stated at 868,341 tons, which includes 18,428 tons in Lancashire, but there is a decrease in Staffordshire of 7152 tons. On the Great Western line there was an increase of 1,114,139 tons, all of which is due to the South Wales traffic, there being decreases in other directions. On the Manchester, Sheffield and Lincolnshire line the increase is stated at 202,780 tons; on the Lancashire and Yorkshire, 472,285 tons, with a decrease of 2832 in Lancashire; on the North Staffordshire, 291,008 tons; on the Scotch lines, 373,438 tons; and on the canals, 119,783; altogether a net increase of 4,610,180 tons in the quantity of coal carried in the year as compared with 1872. There was a decrease of 597,860 tons in the coal, coke and other fuel exported to foreign countries, and an increase of 342,765 tons in the amount sent coastwise, which leaves a net decrease of 255,104 tons in the quantity shipped in the year. But even deducting this from the large amount carried by rail and on the canals there is an increase of more than four and one quarter million tons in the quantity of coals carried during the year.

SCOTCH PIG IRON.

The Scotch pig iron market has been quiet since I last wrote, and although there has been a fairly steady business doing on shipping account, there is still a good deal of pig iron going into stores. During the last fortnight the total stock in Connal & Co.'s warehouses has been augmented to the extent of over 4000 tons, and is now over 23,000 tons. Last year at this time there were about 35,870 tons in the same stores, the average price of warrants being then 108/, and now about 84/ to 84/6. In view of the increasing stocks, and a probable further increase, makers' prices are some shillings per ton lower in price. This is the more apparent from the fact that although the shipments for last week were over 13,000 tons, iron continued to be sent into store. Writing on November 28, Messrs. James Watson & Co., Glasgow, reported: "The tone of our market for Scotch pig iron has been quieter this week, with business in warrants from 85/6 to 84/, cash, closing firmer, buyers 84/6. Shipments last week were 13,700 tons against 10,324 tons in the corresponding week of 1873."

	No. 1.	No. 3.
G. M. B., at Glasgow	89/	81/
Gartsherrie, "	101/	85/6
Coltness, "	102/6	84/6
Summerlee, "	96/	81/6
Langloan, "	101/	84/6
Carnbroe, "	92/6	82/6
Calder, at Port Dundas	102/6	83/6
Gleugarnock, at Ardrossan	94/6	84/6
Eglinton, "	88/	80/
Dalmellington, "	89/	81/
Shotts, at Leith	100/	84/
Kinneil, at Bo'ness	90/6	78/

Freights continue to be very low, 15/ to New York from Glasgow or Ardrossan, and 18/ to 17/ respectively to Boston. Pig iron for ballast quoted at 60/ per ton delivered alongside ship in the Clyde. The monthly average price of warrants for this and last year, as given by Messrs. Swan Bros., is as under:

Jan.	Feb.	March	April	May	June
106/3,	96,	87/2,	75/9,	85/9,	95/8½,
128/9,	137/11,	131/8,	117/7½,	114/8,	110/10½,
July	Aug.	Sept.	Oct.	Nov.	Dec.
81/9,	85/8½,	85/6½,	84/7½		
109/2,	109/4½,	115/5,	113/,	107/7½,	105/6.

DISTRESS IN THE NORTH OF ENGLAND.

There is great depression in the iron trade of the North of England (Cleveland), owing in a great measure to the total absence of rail orders. Several thousand men are out of work, and they with their families are in great distress. A public meeting has been held at Darlington, and means of relief are being organized. At the same time it was thought that men who had such large wages for two or three years ought to have acted more carefully and providentially.

TRADES OF SHEFFIELD.

Business must again be reported quiet at the majority of the iron and steel works, although all cannot be included in the same category, inasmuch as Parkgate and some few other works are doing a good trade in plates of various kinds and other classes of iron.

At some of the establishments Monday and Monday night were worked, owing to the fact that they were closed on Tuesday and Wednesday by reason of the winter fair holidays. A number of the district collieries were set down for those days from the same cause, the men being attracted by the double allurements of the fair and a "great handicap" at Sheffield. There is little or no change in the price of ores, British hematites being quoted at from 23/ to 26/, and Spanish nominally at 16/ to 19/ at British ports. Ordinary ironstone is in abundant supply, and is being used with much freedom by the local blast furnaces and works. There is no quotable alteration in the prices of Cleveland, local, and hematite pig iron of any brand.

At the second annual meeting of the shareholders of G. & J. Brown & Co., limited, Rotherham, held on Friday last, a report was read showing that there had been a considerable loss on the years' working of the tire department, but there had been fair profits in the mill and forge departments. It was also stated that there had been a loss in the working of the Thorpe Colliery belonging to the company. The balance sheet was adopted and a dividend declared at the rate of 10 per cent., payable in January, 1875.

The prospectus has been issued of the Scarsdale and East Derbyshire Steam Cultivation Company, limited, with a capital of £5000 in £20 shares. The company has been started for the purpose of enabling farmers in the district to avail themselves of steam machinery for cultivating purposes. It is proposed to start almost immediately. An influential directorate has been secured.

There is a fairly good inquiry for best cast steel and crucible steel of various qualities. Sheet steel for pen making and sundry finer uses is also in steady and large request.

In treating of the principal industries of this locality, the dreadful colliery explosion which took place on Friday morning last cannot well be unnoticed. This calamitous occurrence, which has attracted national attention, took place a few minutes past eight o'clock on the morning named, at a pit owned by Messrs. G. & J. Charlesworth, and variously termed the Old Pit, Rawmarsh Bottom, the Victoria Pit, and the Victoria Colliery, Warren Vale. With its general features I connot here deal, but may state that the colliery was generally regarded as one of the very best, in point of ventilation and general arrangement, in the whole district. It had several shafts—one just on the other side of the narrow road passing close to the drawing shaft, and another at Swinton Common. Many of the miners made their escape by this last, and it is believed that the very extent of the workings and number of outlets tended most materially to limit the dire results of the explosion. From the bottom of the drawing shaft, which was about 120 yards deep, there was an engine plane extending for about one mile in either direction following the dip of the coal seam. This seam is there about 9 ft. in thickness, and is the well known Barnsley thick coal.

It nowhere attains a greater thickness, and gradually diminishes down to 6 ft., and then to 4 ft. 6 in., within a few miles to the southward. From these engine planes benks or workings were driven laterally in the usual manner. It was in one of these benks furthest from the drawing shaft that the disaster originated. So far as is now known or supposed, it is surmised that there was a sudden outburst of gas, either owing to a fall of roof, or by reason of the miners having broken into a "fault" in the strata, which came into contact with a naked light and exploded. The result was the instant death of 23 men and boys, and the serious injury of several others. It is said that naked lights were allowed to be used owing to the exceptionally good ventilation of the mine and the soundness of its roof, and it is even stated that they were used with the cognizance and permission of the government inspector of mines for the district, Mr. F. N. Wardell. Another theory is—and it does not appear at all improbable—that the explosion took place on account of the great change of temperature which began during the small hours of Friday morning, a change whereby the atmosphere became suddenly colder and consequently denser. This will, however, probably be cleared up at the adjourned inquest on December 2d. In order to be in a position to elucidate the matter, Messrs. Wardell & Evans, government inspectors for Derbyshire, commenced a minute inpection of the mine on Wednesday, and will continue it to-day, Thursday, after which work will be resumed.

The coal trade is active so far as house coal is in question, and there is a good inquiry for engine fuel, but I believe the shipping demand is not so brisk. There is so much mineral traffic, however, that the carrying power of the local railways has been most severely taxed. On Sunday, I am informed, the Manchester, Sheffield, and Lincolnshire Railway Company alone ran fifty special trains in order to clear out sidings and junctions, and on the previous Sunday they ran nearly the same number of special trains with a like object. The London coal trade from Derbyshire, as well as South Yorkshire, continues to be active. I notice that the Coalowners' Association, to which reference was made in the *Engineer* some months back, was last week registered under the title of the South Yorkshire and North Derbyshire Coalowners' Association, with a capital of £500,000 in £10 shares.

Mr. F. Brittain, who represented the Sheffield Chamber of Commerce at the Bradford Conference on the Canadian Reciprocity Treaty, last week, has just made a long and interesting report on the matter. He enumerates the various reciprocity treaties which have been passed, showing that they have been beneficial in the highest degree to the United States, seeing that in 1872-73 Great Britain took 67 per cent. of the total exports from the States, while they only took 12 per cent. of our exports. He shows that schedules B and C of the proposed treaty relate to implements, iron of all kinds, steel, &c., and shows it to be of the utmost importance that the treaty, which explicitly protects the interests of American exporters, should also extend the same protection to British exporters, and he believes it will, if passed, do a great deal toward establishing free trade in the United States.

There is not much that is new to report in connection with cutlery and the other light hardware trades. Some sorts of cutlery are in better request both for your market and the Eastern markets of Europe. There have been several days of sharp frost during the week, causing a good demand for skates to set in.

INDUSTRIAL CO OPERATION.

A meeting was held at Birmingham last week under the presidency of the Mayor (Mr. Chamberlain), on the subject of industrial co-operation. Diverse views were expressed, as will be seen. The chairman said an experimental co-operative factory was desirable in the interest of employers as well as employed. It was desirable to settle at the outset what were the principles of industrial co-operation. After fair market value had been paid for labor, and after a fair interest had been paid for the capital, the remainder should be divided between the laborer and the capitalists. Some time ago he took pains to inquire how far the principle of co-operation had been carried out in this country and on the Continent. In France and Germany many manufactories were conducted successfully on this principle. In England there were very few, and these not always a success. It seemed to him that it was only after a business had failed that it was turned into a co-operative concern. It did not seem to occur to the employers to divide with their workpeople until there was no capital to divide. He concluded by hoping that something would be done by the working men of the town toward establishing a co-operative manufactory of some kind. A resolution was then moved and seconded to the effect that industrial co-operation was the means of solving in an equitable manner the hitherto conflicting interests of capital and labor. Mr. George Dixon, M. P., in supporting the resolution, said he had during previous years attended several public meetings in favor of co-operation, but he was extremely sorry to see that from a return presented to the House of Commons there were reports of one or two small co-operative associations from which no benefit was derived by the members. He was inclined to believe that co-operation was theoretically the best means of uniting the conflicting interests of capital and labor, but at the same time they must not understand the resolution to mean that co-operation was the only method; and he for one felt assured it was not the quickest method by which we might approach the object in view.

BIRMINGHAM AND STAFFORDSHIRE.

The iron market in these districts is decidedly flatter, if anything, than it was, and as Christmas is rapidly approaching no real amelioration can be expected to take place this year. It is, further, expected that finished iron will be reduced by at least £1 per ton at the Christmas quarterly meetings, and that as soon as such reduction becomes a positive fact, many orders now held in reserve by the merchants will be given out. Chains, cables and anchors are all lower, as also are some other goods, but common galvanized buckets are 3d per ton higher, a movement simply made to render the business yield a trifle more than the bare returns it has hitherto given. Copper and brass goods, including brass locks, are a little higher, in consonance with the firmness of the copper and metal markets. Engineering iron work meets with a steady inquiry, and there are plenty of orders for stove grates and other manufactured goods, all kinds of hollowware, tinned goods, enamelled ware, chandeliers and gas fittings, and japanned goods sell with great freedom. There is also a good business doing in the fancy button trade, especially with the United States, and a heavy stroke is being done in pins and pens. So far as best iron of high class brands is concerned, it may be said that there is a steady demand on account of engineering and government orders. Commoner iron does not sell with any freedom. Marked bars are £10. 10/; sheets, £13 to £14, for single; plates, £12. 10/ to £13; and angles, £10. 10/ to £11.

SOUTH WALES.

I cannot, again, record any visible change in the condition of the Welsh iron trade. Many of the men are wholly out of work, and not a few, even of the larger establishments, are as nearly as possible at a standstill. It is stated that there is now so much competition in Wales that the quality of the iron made is greatly inferior to what it formerly was. Buyers will not give a fair price for a good article, consequently makers are driven to proportion the quality of the goods to the price offered. Three mills and one furnace are again at work at Cyrfarthfa. At Cromavan the works were stopped last Saturday, and are not likely to be put on again as yet. The export coal trade is much slacker.

THE METAL MARKETS.

There has been a good deal of not very pacific discussion during the week on the subject of an alleged "corner" in copper, and some interesting facts have been elicited. I append some newspaper excerpts and brokers' circulars. The *Daily News* (London) says:

"The recent rise in the price of copper has been the occasion of some curious remarks about the present condition of the trade, which those concerned should be called on to explain. In substance it has been stated that the rise is due to the operations of a clique of speculators, and not to real purchases for consumption, and the stocks so purchased are said to be hidden away somewhere either in this country or abroad, and will eventually be the cause of a heavy fall in price. The explanation has no doubt been made that the wharfingers' statistics, which are usually relied upon to show the position of the trade, are not challenged, but the insinuation that the stocks have been manipulated by speculators remains, and as it is believed that no such manipulation is possible except with stocks in wharfingers' hands, the charge ought either to be made more definite, and proof of it furnished, or it should be withdrawn altogether. So far as the wharfingers' statistics go, there is certainly little sign of any speculative manipulation being in progress; but, on the contrary, there has been a regular and steady increase in the deliverics of copper, coupled with a diminution of the stocks in hand for a long time past. According to the figures in the circulars of Messrs. James & Snakespeare, which are before us, the history of the trade since the great speculation in copper at the beginning of 1872 has been that in that year the great rise of price caused a total import of 61,428 tons into England and France, while the deliveries for consumption were only 47,976 tons, so that the stocks which had fallen to about 19,000 tons at the beginning of 1872 increased by January 1, 1873, to the more normal figure of 32,751 tons. In 1873, however, the deliveries recommenced to overtake the imports, the average monthly delivery being 4723 tons against an import of 4396 tons, which makes a total delivery for the year of 56,664 tons against an import of 52,752 tons, so that the stock on the 1st January, 1874, had fallen to 28,844 tons. This diminution has been going on all through the present year. The imports for the ten months ending 31st October have been 49,235 tons, and the deliveries 55,497 tons, further reducing the stocks on the 1st November to 22,582 tons. As the price has ruled low since 1872, and until lately continued to fall, there is certainly nothing in these figures to indicate a speculative manipulation, and the details of the monthly deliveries during the present year are also free from any such sudden fluctuation as would probably have attended any great speculative movement. The price, moreover, has even now risen very little as compared with the 1st January last, Chili bars being then £83. 10/ per ton, and now £88. 10/ per ton, although the rise from the lowest point of the year is no doubt considerably greater. It remains, therefore, for those who have asserted some speculative manipulation to have taken place to point out in what way the statistics of the trade confirm them, and what real ground there is for thinking that there has been an accumulation of concealed stocks which make the published statistics untrustworthy. Such statements, unless properly supported, are obviously calculated to do a great deal of mischief, and to injure many private interests by diverting attention from the real causes operating on the markets."

These remarks have elicited a reply from Messrs. James & Shakspeare, who say: "As you have drawn attention to the position of copper, we crave an opportunity of supplementing your remarks. It is well known to those conversant with the article that such a manipulation of the stocks, as has been suggested, is utterly impossible to carry through without entailing immediate discovery, and we are confident that no proof whatsoever can be adduced in support of the assertion that Chili bars (or, indeed, any other sort of copper) have been fictitiously bought up and taken away in order to create a false impression on the market. No doubt deliveries of copper are larger than heretofore, but this arises from purely legitimate causes, and is in no wise due to speculation. Like all other commodities, the consumption increases yearly, and in this instance there is a special reason why it should be on a continually enlarging scale, viz., the gigantic demand for war purposes in the shape of metallic cartridges. How large the consumption is for this purpose it is impossible to estimate; but, great as it has yet been, it is still increasing, and we believe that this alone has enabled Europe to absorb the surplus stock of the world (drawn here by the high prices of 1872), as well as the shipments of Lake Superior ingot, lately thrown on this market through the disturbance of trade in America. As a proof of the foregoing, we may point out that, although the United States have sent this year about 4000 tons of metal (a supply which we are not accustomed to receive), the stocks of copper in Europe have decreased by about 6000 tons since January 1st last, thus showing a consumption of about 1000 tons per month in excess of the supply. What the future course of prices may be we do not pretend to indicate; but, so far as our experience is concerned, we have never seen a more legitimate increase in value accompanied by so little speculation. Surely, the purchases by English smelters of ore and regulus cannot be called speculative; and if they have bought so extensively both spot and forward parcels as to cause surprise in some quarters, it must be conceded that their operations have not been conducted without due consideration of the position and prospects of the article."

Von Dadelzen & North's report says: "*Copper.*—There has been less demand for Chili bars, but prices continue very firm. G. O. B., £88 to £88. 10/, cash; particular brands from £89 to £91. The telegram advising the charters for second fortnight October has not yet been received. Regulas has realized higher rates—18/3 and 18/4½ per unit. Wallaroo is held for £97. English very stiff, and smelters shy sellers, except at extreme rates. Tough, £96; select, £98; and sheets, £102, are the quotations. Tin slackened during the week, and Straits was done at £92. 10/, and even £92, for immediate delivery. Australian, £92 to £92. 10/. Since the result of the Dutch sale prices are 20/ better. The Dutch sale yesterday went at an average of 58·40f.—£102 in London. English Tin has been rather easier; L. and F. to-day quoted £99 to £100. Tin plates in fair demand. Lead remains firm and rather dearer; £24 for good soft English pig. Spelter nominally £24. Quicksilver has been done at £25, to arrive, and small second-hand lots on the spot at £25. 10/."

Vivian, Younger & Co.'s remarks are these: "Metals have been generally rather dull during the week, being partly influenced by the unsettled state of the money market; but we close with a better feeling apparent, no change in the rate of discount from 5 per cent. having been made yesterday. *Copper.*—At the Swansea Ticketing on Tuesday last, 1032 tons British and Foreign Ores sold at an average of 17/5 per unit for an average of 17¼ per cent., Cape Ores of 31¼ per cent. realizing 17/10¼ per unit. By private contract 600 tons of Regulus at Swansea have been sold to smelters at 18/3 to 18/4½ per unit. The general tone of the market during the past week has been otherwise dull, and though nothing has been pressed for sale, and consequently prices are only 10/ easier, but few sales have been made to the trade, and the transactions for the week are limited to a few hundred tons of Chili Bars at £88. 10/ to £89, part named brands and for arrival. The absence of further Chilian news since the 17th ultimo at Valparaiso, has partly contributed to the general want of animation in foreign sorts, and cablegrams are now daily expected with charters for the second half of October and the first half of November. Australian but little doing at £96. 10/ for Wallaroo, £95 for Burra, and £92. 10/ to £95. 10/ for ingots of various brands. English in good demand, especially for tough cake and ingot up to £96. In best selected, second-hand parcels have offered at from £95 to £96. 10/, but have now been pretty well cleared off, and the rates asked by smelters vary from £97 to £100. Manufactured in moderate request up to £102 for strong sheets. *Tin.*—At the Dutch sale, which took place yesterday, 20,100 slabs of Banca realized 58·40 guilders, equal to 101/6 laid down here. For same days previously very little business took place in any description, a few small sales of Straits being reported down to 92/6, and of Australian at 92/. Since the Dutch sale, the market has improved 10/ to 20/, closing rather buyers at quotations. English has only been in moderate request at 99/. *Tin Plates*—In moderate demand. *Iron*—Unsettled in most branches. *Spelter and Lead*—Steady, without any special change to notice."

A most beautiful and permanent green bronze coating may be imparted to cast and wrought iron, sheet iron, wire, etc., according to Paul Weiskopf, by a solution of one part of sylinate of silver in twenty parts of oil of lavender. The surface to be bronzed must be well cleansed (not necessarily polished) and dried, and then lightly coated with the liquid by means of a hair pencil and warmed rapidly up to 302°, the proper temperature being readily recognized by the uniform brilliant intense green color of all portions. Designs in bronze may be produced by substituting Venetian, turpentine, or a solution of colophny in oil of lavender, for a portion of the oil of lavender, by rubbing the dry sylinate of silver with the resin, and adding oil of lavender to the consistency of ordinary paint. Iron thus bronzed may be subsequently electrically coated with copper, and the latter will not be deposited on the bronze places. Articles of copper, brass, etc., coated with the above solution and heated to about 482°, become covered with a gray, dull film of silver, of a reddish cast, which is not permanent, but after being varnished, presents an appearance similar to the so-called oxidized metals.

Zinc.

BY E. J. HALLOCK.

The history of spelter could be written in a few words, for it is a metal of modern times, and some of its most important uses have been discovered within a few years. It differs so much in its combustibility, and in its low melting and boiling points from most other heavy metals, that centuries elapsed before a method of separating it from its ores was devised. It is true that the ancient Greeks and Romans made brass, but they used an ore of zinc for mixing with the copper, instead of preparing the metal and using that. It was not until the eighteenth century that metallic zinc, or spelter, as it is called in commerce, was prepared in Europe, and up to the beginning of the present century its only use was in the manufacture of brass. At a temperature a little above the boiling point of water, zinc is malleable and ductile, and with the exception of that intended to be used in alloys, most of the zinc used in the arts is rolled into sheets. When exposed to moist air it soon becomes covered with a film of oxide, which effectually protects it from farther oxidation. It is, however, readily acted upon by acids, even when dilute, and burns so readily that it cannot be employed where it will be subject to a high temperature. It is used for the positive element in all voltaic batteries, and nearly all the metals may be precipitated from their salts by it.

Pure zinc is never found in nature. It usually occurs as oxide, sulphide or silicate, but many other compounds are met with occasionally. The red oxide of zinc, called by mineralogists zincite, contains from 88 to 96 per cent. of oxide of zinc, with small and varying quantities of iron and manganese. It is found in this country chiefly at Stirling Hill and Mine Hill, N. J. It is easily recognized by its red color and orange yellow streak. It is not as hard as hematite, and does not scratch glass. It dissolves in acids, does not fuse before the blow pipe, but when heated with a flux on charcoal, in the reducing flame, gives a coating of oxide of zinc, which is yellow while hot, but white when cold. This coating turns green when moistened with nitrate of cobalt solution and heated again. Another important ore of zinc known as Franklinite, is very abundant at Hamburg and in other parts of New Jersey. It contains from 10 to 25 per cent. of oxide of zinc, and 66 per cent. sesquioxide of iron, while the remainder is oxide of manganese. It is a little harder than the red oxide, has an iron-black color and dark reddish-brown streak. It acts on the magnet slightly, and might be mistaken for magnetic iron ore. When dissolved in muriatic acid, some chlorine is evolved. Fluxed with borax and soda or charcoal, it gives a faint coating of oxide of zinc. Intimately mixed with the above ore is found a third, called Willemite, which is a silicate of zinc. The mixture shows a curious alternation of red and black spots. Its color varies from pale honey-yellow to dark ash-gray and flesh-red. Heated with soda on charcoal, it gives the yellow coating above described, which becomes white on cooling. The hydrated silicate, called Calamine, is found in several States of the Union. At Friedensville, Pa., it is abundant and extensively worked. It is also abundant at Austin's mines, Wythe county, Va. It has a white color; its specific gravity is between fluorspar and limonite iron ore; it also gives the usual zinc reaction on charcoal. The name is supposed to have been derived from *Cadmia*, a word used by Pliny and other ancient writers for silicates and carbonates of zinc, as well as the oxide from chimneys. The silicate has now received the name of Smithsonite. It is usually white, and has a vitreous or pearly luster. It is abundant at Lancaster, Pa. The sulphuret of zinc is called blend, from a German word meaning blind or deceiving, because it often resembles galena; another name for it is sphalerite, from a Greek word signifying treacherous. It is, however, but half as heavy as galena, and much harder. Some varieties contain as much as 3 per cent. of cadmium, a metal resembling zinc, but more volatile. Traces of indium are occasionally found in blende.

Zinc is always obtained from the ore by distillation, the ore having been first roasted if it contains sulphur, and then mixed with carbonaceous matter and flux. Three different methods of distillation are employed: 1st. In muffle-shaped retorts, known as the Silesian method; 2d. In tubes, known as the Belgian method; 3d. In crucibles, known as the English method.

In the Silesian method, fire clay retorts 3 feet long, like those used in the gas house, are employed. The front of the retort has two openings, one at the top and the other at the bottom. The lower one is closed by a door which is only opened to take out the residue of the distillation. At the upper opening is inserted a tube bent like an inverted ┐. The charge is introduced through a hole in the tube at the upper right hand corner. The zinc distills over and falls from the bottom of the tube into crucibles placed to receive it. The first distillate contains nearly all the cadmium. Ten to twenty of these muffle retorts are placed in one furnace, the arches of which are so arranged as to concentrate the heat from the hearths placed longitudinally.

In the Belgian process the retorts consist of tubes of fire clay 40 inches long, 7 inches wide and 2 inches thick, closed at one end. These are arranged with an inclination downward to the receivers, and in a tall furnace in eight tiers of six each. As the upper rows are farther from the furnace heat, which is below them all, the most readily reducible ores are placed in the upper ones. The zinc vapors are condensed in two tubes, each about 16 inches long, but both tapering so that the outer end of the second is not more than an inch in diameter. These condensers are removed every two hours during working. The outer contains oxide of zinc, which is reserved for working with a fresh charge; the inner one reduced zinc, which is raked out and cast into ingots. A charge of 48 retorts can be worked in 12 hours. This method is employed on a large scale in the Vielle Montagne Company's works, near Liege, Belgium. It is also used at the Lehigh Zinc Works, in Pennsylvania.

In England and Wales the zinc is obtained by downward distillation. The furnace employed resembles an ordinary glass working furnace, in the center of which is a fire place surrounded by large crucibles, which sometimes hold 3 cwt. of ore, and coal enough to reduce it. Over these pots is a dome with an opening over each pot, for introducing the charge and luting on the cover. Each pot has a hole in the bottom, and a short tube luted into it, passing down through the stone floor. These holes are stopped up with plugs of soft wood, which soon char and permit the vapors to pass through, but retain the solid matters. The lids are luted on the pots, and when a bluish-white flame appears at the end of the tube, a longer piece is attached and the metal condensed into dishes below. The distillation occupies about 36 hours.

These are the principal methods employed for reducing zinc ores, the Belgian being the one most popular in this country. Another method, invented by Ponsard, consists in the reduction of the ore by a reducing flame on the hearth of a suitable flame furnace. The zinc vapors escape at the upper end of the furnace into a condenser, with double walls, between which flows a stream of water. The escaping gas enters a regenerating chamber, where they are heated and then return to the flame furnace.

American zinc has the honor of being the purest in the world. Analyses of spelter made by C. F. Chandler, show that Silesian spelter contains but 97·47 per cent. pure zinc, the Bleiberg spelter 98·05, and La Salle 99·38, whereas Lehigh contains 99·982, and New Jersey 99·976.

Zinc is now extensively employed for galvanizing iron, both in sheets and for pipes. While it forms an excellent protection against rust, it should not be forgotten that zinc salts are poisonous, and galvanized iron pipes and vessels should never be used for drinking water.

Phosphor Bronze.

The following translation of a report by Professor Spangenberg, of the Academy of Arts and Sciences, Berlin, on "Phosphor Bronze," deserves attention:

"I am happy to state that all the trials which I have made with the phosphor bronze metal, clearly demonstrate its great toughness over ordinary bronze or brass. The last three bars received from you were of forged phosphor bronze, and were expected to be of extreme toughness; the trials I made, however, showed a more moderate and unequal resistance than the unforged phosphor bronze, but, on the other hand, produced a most unexpected and gratifying result by its immense resistance to torsion. The first bar which I tried resisted, without rupture, 3,871,500 bends right and left, at a strain of 14 tons per square inch; 1,996,-900 ditto, 15 tons per square inch; 1,590,000 ditto, 16 tons per square inch. Total, 7,458,-400 bends to the right, and the same number to the left. As the springs of my machine were too weak to increase the strain, I was compelled to substitute a slighter bar, which has up to the present moment resisted as bravely as its predecessor, having until now resisted, without rupture, 500,000 bends right and left, at a strain of 15 tons per square inch; 600,000 ditto, 16 tons per square inch; 400,000 ditto, 17 tons per square inch; 494,000 ditto, 18 tons per square inch. Total, 1,994,000 bends to the right, and the same number to the left.

"As soon as my special machine is repaired I will continue the experiments—firstly, by completing the 2,000,000 bends, and afterward increasing the strain to 19 tons. After each half million bends, right and left, I shall increase the strain to 20 tons, and so on, until a rupture is effected. How far this event may be off it is impossible at present to foretell, but I consider the result of the experiments made worth a great deal already. As a proof, I submit that a bar of Westphalian iron broke after 215,653 bends in both directions at a strain of 12 tons per square inch.

"According to Wohler's experiments—see *Builder's Journal*, 1870—a bar of Krupp's cast steel, taken from an axle, resisted the following number of bends in two opposite directions: 273,800, at 10 tons strain per square inch; 253,800, at 11 tons strain per square inch; 291,-100, at 12 tons strain per square inch; 251,850, at 13 tons strain per square inch; 187,500, at 14 tons strain per square inch; 1,258,050 together. This bar, therefore, at an average strain of 12 tons, resisted one million and a quarter bends, another at a strain of 13 tons about one million bends; whilst, according to my showing above, one bar of phosphor bronze resisted seven and a half millions of bends at an average strain of 18½ tons, and is not yet broken; and the second and slighter bar has, up to the present, resisted without rupture nearly two million bends at an average strain of 16½ tons. As soon as the second trial is completed I will commence a third, and then several other trials, to make sure that the successful results described above are not in any way attributable to accident."

Iron Works in the Fox River District of Michigan.

For the following we are indebted to the Marquette *Mining Journal*. This district extends from Green Bay to Fond du Lac:

THE GREEN BAY IRON COMPANY

was organized with a capital of $100,000. The officers are D. C. Bradley, president; C. E. Sargent, secretary; C. D. Rhodes, treasurer. The furnace is located on the east side of East River, on a plat of 17 acres, at Green Bay, where good dock facilities are afforded, and ample yard room for a large stock of wood, charcoal, ore and flux, as well as for ten 100-cord square kilns. An open top, stone stack, 38 feet high, 9 feet at boshes, was built in 1869. The boilers and engines were placed at the top according to the practice at that time. One engine supplies power for two 36-inch blowing cylinders, geared 3 to 1, as well as for crusher and hoist. An old style brick oven with ox bow pipes proved to be of insufficient heating capacity, and has been displaced by one of Torrence's stoves. During her last blast—nine month's duration—an average product of 19 tons daily was made. A month since the blast was taken off and the stack blown out for repairs. Mr. J. T. Torrence, late of the Joliet Works, under whose superintendence the Joliet stacks were erected, began to rebuild the stack and erect a new oven. The interior of the stack was torn away, and built with a water-jacket surrounding the hearth. The boshes and hearth are entirely new, and built independently of the old stack—leaving piers for the support of the upper portion of the stack. The new work has been built in the strongest manner, being well braced and strengthened by iron stays and supports. A bell and hopper top has been added, and the stack supplied with every modern improvement that practical experience can suggest. A Player oven, containing 24 nine-inch pipes 14 feet high, with, instead of the square elbows, circular tops, to overcome friction on the passing air, has also been erected. The old oven did not give over 400° of heat, while it is confidently expected that a heat of 900 or 1000° may be obtained from the new oven. All the improvements have been made in three weeks, and a fire started to dry the work within that time—certainly a very short time to rebuild a blast furnace. Before this note is in print the stack will be in blast again, and making more iron, no doubt, than ever before. Beside the kilns at the furnace, ten more 100-cord square kilns are located on the Minnesota road. At the furnace about 8000 cords of wood are piled, and at different points the company have an additional stock. The stock house is well supplied with Jackson and New York ore for the present blast. During the season of navigation a barge, owned by the company, transports ore from Escanaba to the furnace plant. Mr. C. E. Sargent, secretary, is located at Green Bay as manager, from whom—and Mr. Torrence, the constructing engineer—the facts we have been able to give were obtained.

Next below the Green Bay, at Depere,

THE NATIONAL IRON COMPANY'S

plant is located. The company has a capital of $200,000, and, perhaps, one of the largest, best arranged and neatest furnace plants in the district. A water front on the river of 800 feet, and 12 feet of water, gives a desirable dockage and a spacious yard for stock purposes. Shipping facilities could not much better accommodate a furnace than at the National. Adjoining the yard, the Milwaukee and Northern track and depot affords transportation for coal and pig iron, when railroad shipments are desirable. At the river front are the docks for the reception of ore and flux, together with cranes and tramways to facilitate the discharge of cargo. Trum cars run from the casting houses to the dock, by means of which the iron is handled very cheaply and expeditiously. While the furnaces were in blast shipments were made during navigation season by water to Chicago and Milwaukee, but in the winter a very favorable contract through to Chicago by rail enabled the company to send the furnace product forward at all seasons of the year. A pair of stacks were in operation until in May last. No. 1 is of stone, 10 feet boshes, and 45 feet high. The stone was obtained at Depere near the location, the stack erected in 1868, and blown in the year following. Subsequently the stack was built over and improved under the direction of J. T. Torrence. Water jackets surround the hearth, in construction like the Green Bay stack, and the piers were left to support the top in much the same manner. No. 2 is an iron shell, on columns, 12 feet boshes, 48 feet high, is supplied with water jackets around the hearth, and was built in 1872. She was blown in in '73. Both stacks are open top with thimble and top flues, and both are blown through five tuyeres. One steam hoist serves both stacks, though not located between them. Both casting houses are large, and front on the river, convenient to docks and railroad track. Each stack has independent engines, nests of boilers, blowing engines and ovens. No. 1 has an engine 16x24, and a pair of blowing cylinders 36x60 inches, and the engine for No. 2 is 18x28, with a pair of horizontal blowing cylinders 40x60 inches. Beside, the engine room contains engines for hoist and crushers, and a sufficient number of force pumps for tuyeres and fire purposes. The ovens are alike in plan and structure, following the Player patents and Torrence's circular, anti-friction top. Each contains 18 pipes, nine inches in diameter and 14 feet high. While the Player stove gives the most uniform temperature, and the arrangement is such as to give a greater heat and longer life to the pipes than any other invention yet known, Mr. Torrence claims that his improvement of circular instead of right-angle elbows facilitates the passage of the air, which it is believed is a desideratum. The engines, boilers and ovens are at the bottom at the National furnaces, and, as we have said, the entire plant is substantially built and the machinery of the best class. Sixty-two kilns are owned by the company, and are distributed in sets in different sections where wood can be purchased. All the kilns are conical, built on level ground, with driveways to the top. Some are 25-cord kilns, but the majority are of 45 cords capacity. The officers of the company are A. B. Meeker, president; W. L. Brown, treasurer; M. R. Hunt, secretary and local manager. P. Dundon is the founder. About half the ore used in these furnaces was shipped from Escanaba, and Marquette furnished the balance. When in blast the average daily product was, No. 1, 20 tons, and No. 2, 25 tons. It is not now intended to blow in either stack before spring, and then the condition of the iron market will determine the question.

On the opposite side of the river, at West Depere,

THE FOX RIVER IRON COMPANY,

a corporation organized under Wisconsin law, have located two stacks. The officers are D. W. Blanchard, president; L. D. Arnold, vice-president and general manager; D. D. Kellogg, secretary; and C. H. Lovelace, superintendent. Both stacks are constructed of stone. No. 1 was built in 1858 by Messrs. Blanchard & Arnold—is 38 feet high, and 9 feet at the boshes. No. 2 was erected by the present company in 1872, the same hight as No. 1, and 10 feet at the boshes, but was subsequently reduced to 9½ feet. Both are open-top stacks, with thimble and top flues. Both stacks are out of blast, and have been since the first of September. The daily product during the blast was 16 tons from each stack, from Saginaw and McComber ores. No. 2 is now undergoing repairs and being relined preparatory to a new blast; yet it is not now settled when her fires will be relighted. Heretofore there were but three tuyeres in each stack, but No. 2 will be supplied with five tuyeres. Formerly the blowers, hoist and crusher were run by water-power, but now one pair of horizontal blowing cylinders, of 5 feet stroke, are attached to an engine 18x30, though water power is still utilized for hoist and crushers. No. 1 oven is a cylindrical iron shell, lined with brick, and contains 42 pipes four inches in diameter and 14 feet long. This stove produces a degree of heat equal to 600 deg. Fah., though from its peculiar shape and from the fact that it was originally erected in an emergency to temporarily supply the demand for a hot blast oven, one might imagine it would not answer the purpose. No. 2 is a brick oven containing 52 ox-bow pipes of the same length and diameter, and the same temperature is gained and preserved as in No. 1. All the machinery and ovens are located at the bottom. The company have a river front and dock, and are located on the Chicago and Northwestern Railway, so that shipments may be made by rail or water, as circumstances may require. In the neighborhood of 16,000 tons of Nos. 1 and 2 pig metal stacked in the yard for shipment, and 35,000 bushels of charcoal remain in the stock sheds. Forty-two conical kilns—mostly 45 cord—supply the coal for both stacks, from different localities. Inasmuch as the company's contracts for metal have been filled, it is extremely doubtful that either stack will be blown in until a favorable change in the iron market is manifest. Meanwhile, repairs will go on under the superintendence of Mr. Lovelace, who has been in charge for more than six years.

THE FOND DU LAC CHARCOAL IRON WORKS,

owned by Mr. Meyer, have not yet been completed, though the stack is still in process of construction, under the supervision of Mr. J. M. White, and will doubtless be completed early next year, and made ready for the blast as soon as "the times" will warrant a further production of pig iron.

THE APPLETON IRON COMPANY

has two stacks located on Grand Chute Island, Appleton, Wis., and seven acres of land. The furnaces are in the heart of the manufacturing interests of Appleton, and are not the least important of the enterprises on Fox River at this point. Both stacks are iron shells on stone piers; they are 40 feet in hight and 8¼ and 8⅛ feet, respectively, at the boshes. No. 1 was erected in 1870, and No. 2 in 1872. Both are open top stacks, with hot blast at top. Each stove has 36 ox-bow pipes, without the modern improvements which late experience has proved so valuable. The never failing water-power of the Fox River takes the place of steam on this location. A turbine wheel is provided for each set of blowers and for the hoist and crusher, so that each one is independent of the other. No. 1 stack has an upright blowing cylinder, while there are two horizontal cylinders for No. 2 stack; and each stack receives the blast through three tuyeres. The daily capacity of both stacks is 34 tons. No. 1 is now in blast,* but No. 2 was blown out some seven weeks since. Ore is received entirely by rail on the Chicago and Northwestern Railway—an elevated trestle work having been erected for the dumping of hopper cars. No. 1 is charged with 300 lbs. Shenango hematite and 500 lbs. Lake Superior slate, and shows a yield of 61 to 63 per cent. Lake Winnebago limestone is used as a flux, and the charcoal or timber is readily obtained in the near vicinity of the plant, so that the ore is the only material to be transported to the furnace. No kilns are located at the furnace, but 28 forty-five cord conical kilns have been built at convenient points for the reception of wood, in several localities. The company cuts the wood, and has available a very large acreage of timber land accessible to the furnace. All things considered, the Appleton stacks are well located for the production of iron very economically. Wood choppers may be had at 55 cents per cord, and the wood at a nominal price, which brings the charcoal down to a price below the cost of charcoal on Lake Superior. Still, the difference in the cost of ore, perhaps, more than compensates for the low cost of fuel, which, added to the lake shipping facilities, brings the total cost on Lake Superior even lower than where the fuel can be obtained so cheaply. The Appleton company is officered as follows: C. Donkersly, president; A. L. Smith, vice president; H. D. Smith, secretary, treasurer and manager, and Jas. Dundon, founder.

The above list includes all the furnaces in the Fox River district. A fair average daily product of the furnaces named is 150 tons; and the amount produced at the time this is written is seventeen tons! Of the eight stacks but one is in blast, unless the Green Bay has blown in since our notes were taken. Possibly, if the average production throughout the country could be reduced to a basis something like the Fox River district, the near future would show a marked increase in the demand and price for pig iron.

Glass Veneer.—There are many processes in the arts and manufactures in which tanks and similar receptacles, combining great strength with perfect cleanliness and non-liability to oxidation, are still desiderata. It is true enameled iron is suitable for some purposes, but when the enamel is worn off, or the surface broken, the vessel is practically done for. To meet these and several other requirements to which we shall further allude, Mr. Joseph Hartley, brewer, of Ormskirk, has devised a method of fixing glass upon iron or any other material, or, rather, he has invented an anti-corrosive cement by which glass may be so fixed. The first practical application which suggested itself to Mr. Hartley was the lining of his own fermenting backs with glass, the suggestion arising out of Mr. Hartley's experience of the difficulty of keeping wood, stone or slate free from secreted stale germs of organic life, and which develop and reproduce themselves in the process of fermenting beer in a highly objectionable manner. Mr. Hartley also suggests that this invention offers a solution to the lead poisioning difficulty, inasmuch as cisterns made upon his principle would be less objectionable than many others, whilst their cost would not be greater. For decorative purposes some very good effects have been produced by this glass veneer, specimens of which we recently examined at the Hop and Malt Exchange, Southwark street. Designs in any color can be placed under glass and preserved from fading or wear. Mr. Hartley's invention, in fact, appears applicable to a variety of useful purposes.

A bell is now on exhibition at the St. Elms Hotel, Philadelphia, which was cast at the Warwick furnace, near Pottstown, Chester county, in 1754, and was used until May 15, 1874. During the Revolutionary War many of the cannons used by the Americans were cast at Warwick furnace. When Washington was at Valley Forge the Hessians passed through the village, and this bell was rung for the purpose of calling the citizens together to assist in burying the cannons, in order to keep them from falling into the hands of the enemy. These cannons have never been unearthed.

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	98	0	0	100	0	0
Tough Cake & Tile	96	0	0	98	0	0
Sheathing and Sheets	110	0	0	103	0	0
Bolts	103	0	0	105	0	0
Bottoms	103	0	0	104	0	0
Old	87	0	0	90	0	0
Australian	96	10	0	97	0	0
Wire, ₱ D.	0	1	1		—	
Tubes, "	0	1	2	0	1	3
Brass—₱ D.						
Sheets	0	0	9½	0	0	10
Wire	0	0	9¾	0	0	10
Tubes	0	0	12	0	0	12¼
Yellow Metal Sheathing	0	0	8¾	0	0	9
Sheets	0	0	8¼	0	0	8¾
Spelter—₱ ton.						
Foreign on the spot	24	15	0	25	0	0
" to arrive	24	15	0	25	0	0
Zinc—₱ ton.						
In Sheets	30	0	0	31	0	0
Quicksilver—₱ bottle.	28	0	0			
Tin—₱ ton.						
English Blocks	100	0	0	101	0	0
Ditto Bars (in bris.)	101	0	0	102	0	0
Ditto Refined	102	0	0		—	
Banca	100	0	0	102	0	0
Straits	92	10	0	93	10	0
Australian	92	0	0	92	10	0
***Tin Plates—† ₱ box.**						
IC Charcoal.....1 qual.	1	16	0		—	
IX " .....1 qual.	2	0	0		—	
IC " .....2 qual.	1	15	0		—	
IX " .....2 qual.	2	1	0		—	
IC Coke	1	6	6	1	9	0
IX "	1	12	6	1	15	0
Canada Plates, ₱ ton.	19	0	0		—	
" at works	18	10	0		—	
Iron—₱ ton.						
Bars Welsh, in London	9	5	0			0
" to arrive	9	0	0			
Nail Rods	9	15	0			0
Nail Rods, Staff'd in L'ndon	10	5	0	11	0	0
Bars	11	0	0	12	0	0
Hoops	13	0	0			
Bars at Works	10	0	0	11	0	0
Hoops ditto	11	0	0	12	0	0
Sheets, single, and plates	12	15	0	14	0	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	8	0	0	8	5	0
Do, merchant, Tyne or Tees	8	10	0		—	
Ditto, Railway, in Wales	7	0	0	7	5	0
Ditto, Swedish, in London	16	0	0	17	0	0
To arrive	17	5	0			0
Pig, No. 1, in Clyde	4	7	0	5	12	6
Ditto, f.o.b., Tyne or Tees	4	0	0	4	5	0
Ditto, Nos. 3, 4, f.o.b	3	10	0	4		0
Railway Chairs	5	0	0	5	5	6
" Spikes	12	10	0	14	0	0
Indian Ch'coal Pigs in L'don	8	0	0	10	0	0
Steel—₱ ton.						
Swedish, in kegs (rolled)		—			—	
Ditto (hammered)	19		0	20	0	
Ditto, in faggots	20	10	0		—	
English, spring	19	0	0	24	0	0
Lead—₱ ton						
English Pig, common	23	15	0		—	
Ditto, LB	23	15	0			
Ditto, WB	23	15	0			
Ditto, Sheet	24	15	0			
Ditto, Red Lead	25	0	0			
Ditto, White	30	0	0	32	0	0
Ditto, Patent Shot	26	10	0	26	15	0
Spanish	28	0	0	28	0	0

* At the works, 1s. to 1s. 6d. per ton less. Terne plates 2s. per box below tin plates of similar brands.
† Add 6s. for each X.

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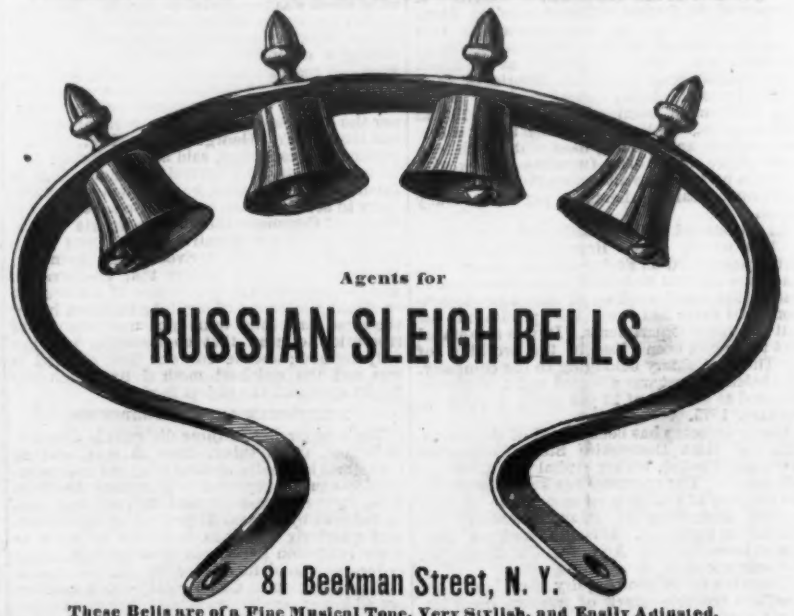

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80, Polished Bells, Japanned Bow	$30 00	84, Gold Plated Bells, Gold Plated Bow	$90 00
81, Silver Plated Bells, Japanned Bow	40 00	85, Nickel Plated Bells, Nickel Plated Bow	60 00
82, Silver Plated Bells, Silver Plated Bow	60 00	86, Polished Bells, Polished Bow	45 00
83, Gold Plated Bells, Silver Plated Bow	75 00	Discount 25 per cent.	

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No.	Weight. lbs.	Cuts.		Price.
No. 1,	16 lbs.,	⅜x2 in.,	or ½ in. round or sq.	$25
No. 2,	165 lbs.,	⅜x3 in.,	or ½ in. " "	50
No. 3,	312 lbs.,	6-8x4 in.,	or 4-4 in. " "	75

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In addition to the 20 Cast Steel Tools inclosed in this handle, it will hold anything from an 8 inch Mill File to a Cambric Needle. It is by far the best Tool Holder in use, and will also answer nearly all the purposes of a Hand Vise. The wood is lignumvitæ and hard maple, the ferrule, malleable iron, and the jaws cast steel. Most hardware dealers keep them, or will send to us for them.

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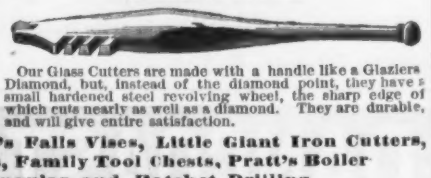
Manufacture **Barber's Bit Braces, Miller's Falls Vises, Little Giant Iron Cutters, Adjustable Chuck Breast Drills, Family Tool Chests, Pratt's Boiler Tube Scrapers, Patent Angular and Ratchet Drilling Machines, Langdon Mitre Boxes.**



GLASS CUTTERS.

Our Glass Cutters are made with a handle like a Glaziers Diamond, but, instead of the diamond point, they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable, and will give entire satisfaction.

HOWARD PARALLEL BENCH VISE.

MANUFACTURED BY

Howard Iron Works,

Send for price list. Buffalo, N. Y.

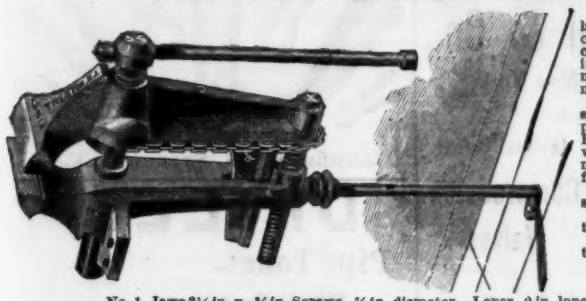
RUSSELL & ERWIN MFG. CO., New York and Philadelphia, Agents.

NOTICE.

These **Vises** are only manufactured at the **HOWARD IRON WORKS**, at **Buffalo, N. Y.** and are so stamped. The improvements in these **Vises** which are patented are valuable, and parties who claim to manufacture, and are offering a **Vise** representing it to be the same as the **HOWARD VISE**, are deceiving the Trade.

HOWARD IRON WORKS.

The New Double Screw Parallel "Leg" Vise.



We are now ready to furnish, as the result of more than thirty years' experience, our latest style of Vise—the best yet made. It is stronger than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type, and which, depending upon slides alone for preserving parallelism, can never be screwed up very hard without "jamming" on the slides or breaking.

Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and at the same time greatly superior to it; is always perfectly parallel at all points of opening, and never gets out of line. Embodying the same general principle as the well known Chain Vise, so long made by us, we have by new, scientific proportionings of all the parts, and with our recently improved metals for their manufacture, obtained so perfect a tool, that we now *warrant* these Vises for *three years* from date of manufacture stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes.

The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it.

The chain is very accurately made of steeled links and rivets, and having no strain of the work upon it, is therefore as durable as all the other parts.

Prices with Special Discounts to the Trade.

No. 1,	Jaws	3½	in. x	⅝	in.	Screws	⅝	in. diameter.	Lever	9 in. long,
" 2,	"	4½	in. x	1	in.	"	1⅛	in.	"	13 in. "
" 3,	"	5¼	in. x	1¼	in.	"	1¼	in.	"	16 in. "
" 4,	"	6¾	in. x	1¾	in.	"	1½	in.	"	19 in. "
" 5,	"	7	in. x	1⅝	in.	"	1⅝	in.	"	24 in. "
" 6,	"	8	in. x	1⅝	in.	"	1⅝	in.	"	26 in. "

Opens	4¼	in. $8 00
"	5¼	in. 12 00
"	6¾	in. 17 00
"	7¾	in. 22 00
"	9	in. 30 00
"	10	in. 34 00

All sizes of these Vises furnished with Swivel Attachment, at an additional cost of $1 to $3. Sold at the General Agencies.

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

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Sole Manufacturers of

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PAGE'S PATENT TANNED Leather manf'd under Pat. MAY 8—1866. PAT. SEPT. 12, 1871.

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Also, Picker or Moccasin Leather, for Boot and Shoe Packs.

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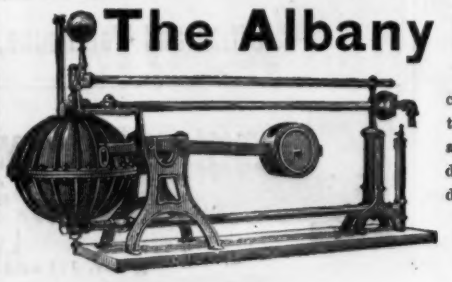
Ask for Star Stamped Lace Leather.

The Albany Steam Trap.



This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

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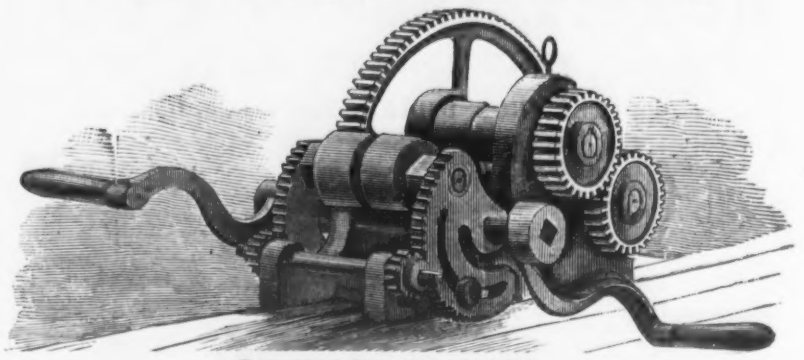
Albany, N. Y.

Guy C. Hotchkiss, Field & Co.,

85 First St., Brooklyn, E. D., and New York City.



Patented January 13, 1874.

This Machine is destined to supersede all Tire Benders now in use, especially for heavy work. The middle roller can be readily removed and readjusted, thus allowing Tires to be withdrawn without difficulty after being bent. Fifth Wheels and Tires never slip while being bent in this Machine. One man can bend a Tire 8x1 without difficulty.

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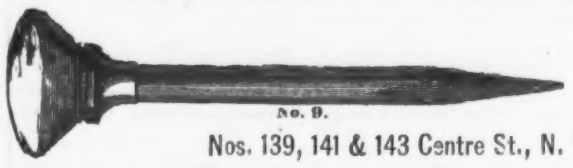

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BRIGHT WIRE GOODS,

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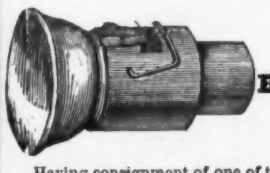
FURNITURE NAILS,



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Wrought Iron and Brass Butts.

Having consignment of one of the largest German manufacturers of **Halter and Coil Chains** we can offer inducements on these goods.

We shall be pleased to send our new lists and prices to those who will apply.

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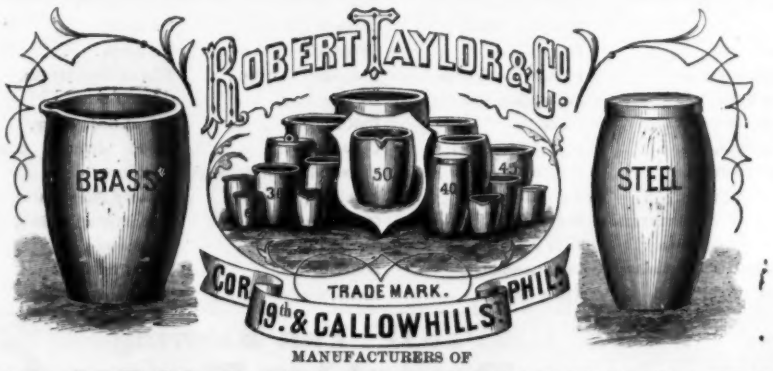

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Steel, Brass, Gold, Nickel and all kinds of Metals.

Mr. Robert Taylor, who was for seven years the head of the late firm of Taylor, Strow & Co., and who is a practical mechanic, and familiar with all the details of the manufacture of Crucibles, attends personally to our manufacturing department. We would, therefore, respectfully solicit a continuance of the favors hitherto extended to him.

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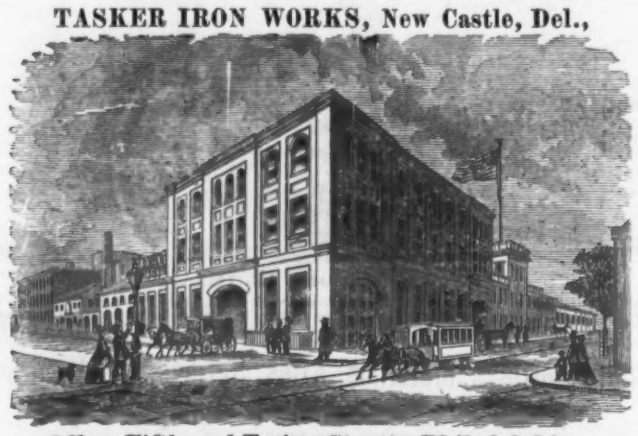

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Tire Bolts,	Adjustable Plumbs and	Ox Bow Pins,	Can Openers,
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With or without Hood.

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☞ **IT HAS NO BACK DRAUGHT.**

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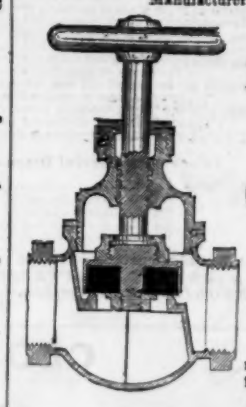

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Each Wrench takes four Sizes of Pipe.

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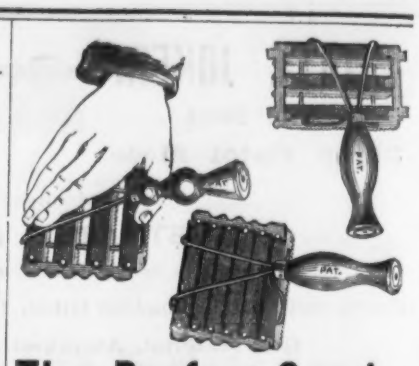

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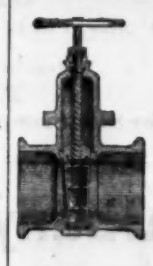

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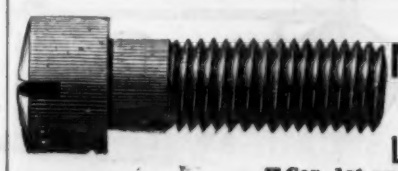

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Wyatt Thos., 771 Eddy, Providence, R. I. 33

Chisels, *Manufacturers of.*
Barton D. R., Rochester, N. Y. 28
Buck Bros., Millbury, Mass. 11

Coal, *Miners of.*
Pardee A. & Co., 111 Broadway, N. Y. 31

Coal Vases.
Sidney Shepard & Co., Buffalo, N. Y. 27

Coal Hods, *Manufacturers of.*
Easterbrook Wm., 311 Cherry, Phila. 36
Smith, Burns & Co., 46 Cliff, N. Y. 30

Coffee and Spice Mills.
Lane Brothers, Millbrook, N. Y. 3
Enterprise Mfg. Co., Philadelphia, Pa. 30

Commission Merchants, *English.*
Goddard Samuel A. & Co., Birmingham, Eng. 27

Compasses and Dividers, *Manufacturers of.*
Bemis & Call Hardw. & Tool Co., Springfield, Mass. 23

Cooper's Tools, etc., *Dealers in.*
Little Chas. E., 59 Fulton N. Y. 7

Crucibles, *Manufacturers of.*
Newkumet Adam, 1537 N. Front, Phila. 29
Straw, Wile & Co., 709 Market, Phila. 21
Taylor Robert & Co., 1900 to 1906 Callowhill, Phila. 21

Curry Combs, *Manufacturers of.*
Bartholomew G. W. & H. S., Bristol, Ct. 13
Kellogg W. P. & Co., Troy, N. Y. 22
Lawrence Curry Comb Co., 342 3d Avenue, N. Y. 22

Cutlery, *Importers of.*
Boker Hermann & Co., 101 Duane, N. Y. 28
Fisher Jos. S., 411 Commerce, Phila. 11
King, Briggs & Co., 80 Chambers, N. Y. 11
Peace Chas. Jr., 82 Chambers, N. Y. 11
Peters Bros., 88 Chambers, N. Y. 11
Tillmes A. & Co., 521 Commerce, Phila. 11
Ward Asline, 101 Duane, N. Y. 11
Wilson Hawksworth, Ellison & Co., 73 John, N. Y. 32

Cutlery, *Manufacturers of.*
Burnishaw Aaron, Pepperell, Mass. 11
John Russell Cutlery Co., Turners Falls, Mass. 11
Meriden Cutlery Co., 49 Chambers, N. Y. 11
Miller Bros. Cutlery Co., W. Meriden, Conn. 11
Northampton Cutlery Co., 45 Murray, N. Y. 11
New York Knife Co., Walden, N. Y. 11
Woods Cutlery Co., Antrim, N. H. 11

Differential Pulley Blocks, *Makers of.*
Van Wart & McCoy, 43 Chambers, N. Y. 35

Door Alarm, *Makers of.*
F. Blakemore, 3452 Market, Philadelphia 23

Door and Gate Springs.
Hammond W. S., Lewisberry, Pa. 24
Quackenbush, Townsend & Co., 59 Reade, N. Y. 28
Van Wagoner & Williams, 27 Park Row 36

Dredging, *and Makers of Dredging Machines.*
Am. Dredging Co., 108 S. Delaware ave., Phila. 35

Drill Chucks, *Manufacturers of.*
Lambertville Iron Works, Lambertville, N. J. 35

Drilling Machines. *Makers of.*
Miller Falls Co., 78 Beekman, N. Y. 34
Thorne & DeHaven, Philadelphia 31

Drop Forgings.
Phila. Forging Works, 1203 to 1207 E. Thompson, Philadelphia 34

Edge Tools, *Makers of.*
Barton D. R., Rochester, N. Y. 28
Bradley G. W., 87 Chambers, N. Y. 7

Egg Beaters, *Manufacturers of.*
Dover Stamping Co., 88 North, Boston 21

Elevators, *Makers of.*
Howard Geo. C., 17 S. 18th, Phila. 36
Otis Bros. & Co., 348 Broadway, N. Y. 9

Emery.
Abbott & Howard, New York and Boston. 23
The Union Stone Co., 6 Exchange, Boston 28

Emery Cloth.
The Union Stone Co., 6 Exchange, Boston 28

Emery Wheels. *Makers of.*
Lehigh Valley Emery Wheel Co., Wiessport, Pa. 28
The Union Stone Co., 6 Exchange, Boston 28

Endless Lever Hoists and Weight Movers.
Reamy Truck Co., Baltimore, Md. 9

Engineers, Machinists, etc.
Henshall James, 1026 Beach, Phila. 35
Moore James, cor. 16th and Buttonwood, Phila. 29

Engines, Steam. *Makers of.*
Haskins' Machine Co., Fitchburg, Mass. 35
New York Steam Engine Co. 98 Chambers, N. Y. 35
Shapley & Wells, Binghamton, N. Y. 35
Tanner Wm. E. & Co., Richmond, Va. 16
Woodruff Iron Works, Hartford, Conn. 34

Exporters.
Keuffel & Esser, 111 Fulton, N. Y. 36

Faucets, *Self-Measuring, Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y. 30

Files, *Importers of.*
Carr J. & Riley 82 John, N. Y. 32
Dickinson Henry, 66 and 68 Reade, N. Y. 11
Fisher Joseph S., 411 Commerce, Phila. 11
Frasse Peter A. & Co. 25 Fulton, N. Y. 8
Moss F. W., 80 John, N. Y. 32
Sanderson Bros. & Co., 16 Cliff, N. Y. 32
Spear & Jackson, 116 Duane, N. Y. 29

Files, *Manufacturers of.*
Adamantine File Works, Providence, R. I. 13
American File Co., Pawtucket, R. I. 6
Auburn File Works, Auburn, N. Y. 8
Barnett G. & H., 41 and 43 Richmond, Phila. 8
McCaffrey & Bro., 1732 and 1734 N. 4th, Phila. 8
Nicholson File Co., Providence, R. I. 8
Wheeler, Clemson & Co., Middletown, N. Y. 10
Walsh, Coulter & Flagler, 88 Chambers, N. Y. 8
Western File Works, Beaver Falls, Pa. 8

Fire Brick, *Makers of.*
Brooklyn Clay Retort and Fire Brick Works, Van Dyke, st., Brooklyn, N. Y. 23
Hall A. & Sons, Perth Amboy, N. J. 23
Hall A. & Sons, Buffalo, N. Y. 23
Kreischer B. & Son, 58 Goerck, N. Y. 23
Newkumet Philip, 23d and Vine, Phila. 23
Newton & Co., Albany, N. Y. 23
Salamander Works of Woodbridge, N. J., foot of Bethune St., N. Y. 23
Watson John R. Perth Amboy, N. J. 23

Fluting Machines.
Myers Mfg. Co., 200 Centre, N. Y. 7

Flint and Emery Paper and Cloth.
Baeder, Adamson & Co., 730 Market, Phila. 11

Founders and Machinists.
Garrison A. & Co., Pittsburgh, Pa. 4

Galvanized Iron.
Lefferts Marshall Jr., 90 Beekman, N. Y. 4
Whitnum S., Greenpoint, L. I. 4

Giant Nail Extractor.
Maltby, Curtiss & Co., Waterbury, Ct. 34

Glass. *Importers of.*
Downing A. C. & Co., 57 Beekman, N. Y. 27

Governors.
Boardman E. Palmer & Co., Lawrence, Mass. 29
Shive Governor Co., Bethlehem, Pa. 34

Grindstones.
Wood Walter R., 283 and 285 Front, N. Y. 28
Wortington & Sons, North Amherst, O. 28

Guns, &c.
Schoverling & Daly, 84 Chamber St. 21
Tryon Edw. K., Jr., & Co., 19 N. Sixth, Philadelphia. 5
Windmuller Louis & Roelker, 20 Reade N. Y. 16

Gunpowder, *Makers of.*
Kneeland P. L. (Dupont) 70 Wall, N. Y. 32
Laflin & Rand Powder Co., 21 Park Row, N. Y. 31

Hammers, etc., *Manufacturers of.*
Emmet Hammer Co., Brooklyn, E. D., N. Y. 2

Hardware, *Brass and Galvanized.*
Tiebout W. & J., 280 Pearl, N. Y. 2

Hardware Commission Merchants.
Fernald & Sise, 100 Chambers, N. Y. 28
Green R. M. & Co., 100 Chambers, N. Y. 30
Graham & Haines, 88 Chambers, N. Y. 30
Maltby, Curtis & Co., 64 Reade, N. Y. 34
Walbridge Geo. B., 99 Chambers, N. Y. 27
Walsh, Coulter & Flagler, 88 Chambers, N. Y. 8
Wilson J. Clark & Co., 81 Beekman, N. Y. 20

Hardware Dealers.
Lloyd, Supplee & Walton, 625 Market, Phila. 10
Quackenbush, Townsend & Co., 59 Reade, N. Y. 29
Shepard Sidney & Co., Buffalo N. Y. 27
Wilson J. Clark & Co., 81 Beekman, N. Y. 20

Hardware Importers.
Boker Hermann & Co., 101 Duane, N. Y. 29
Field Alfred & Co., 98 Chambers, N. Y. 29
King, Briggs & Co., 80 Chambers, N. Y. 10
Frith E., 16 Cliff, N. Y. 10
Van Wart & McCoy, 43 Chambers, N. Y. 10
Turner R. A., 37 Chambers, N. Y. 11
Windmuller Louis & Roelker 20 Reade N. Y. 16

Hardware Manufacturers.
Buffalo Hardware Co., Buffalo, N. Y. 3
Enterprise Mfg. Co., Phila. 30
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. 30
Jacobus & Nimick Mfg. Co., 96 Chambers, N. Y. 29
Kellogg Wm. P. & Co., Troy, N. Y. 30
Lane, Gale & Co., Troy, N. Y. 30
Many & Marshall, 48 Warren, N. Y. 13
Middletown Tool Co., 82 Chambers, N. Y. 29
Miller's Falls Mfg. Co., 78 Beekman, N. Y. 21
Pratt & Co., Buffalo, N. Y. 27
Providence Tool Co., Providence, R. I. 13
Schweitzer Mfg. Co., 97 Reade, N. Y. 30
Shattuck W. F. & Co., 113 Chambers, N. Y. 8
Stanley Works, 79 Chambers, N. Y. 29
Union Mfg. Co., 99 Chambers, N. Y. 7
Williams, White & Churchill, 78 Warren, N. Y. 32
Wilson Mfg. Co., 37 Chambers, N. Y. 12

Hardware Specialties.
Bracher T. W., 77 Greene, N. Y. 31
Byington & Northup, Rochelle, Ills. 3
Goodnow & Wightman, 25 Cornhill, Boston 29
Markt & Co., 139 Centre, N. Y. 21
Post C. C., Burlington, Vt. 10
Pugsley & Chapman, 6 Gold, N. Y. 36
Shepard Sidney & Co., Buffalo, N. Y. 27
Wiley & Russell, Greenfield, Mass. 31

Hog Pluggers, *Manufacturers of.*
Hill H. W. & Co., Decatur Ills. 8

Hoisting Engines, *Makers of.*
Howard Geo. C., 17 S. 18th, Philadelphia 36
Otis Bros. & Co., 348 Broadway, N. Y. 8

Horse Hay Forks and Fixtures, *Makers of.*
Nellis A. J. & Co., Pittsburgh, Pa. 36

Horse Nails, *Makers of.*
Ausable Horse Nail Co., 35 Chambers, N. Y. 28
Brundage & Co., Middletown, N. Y. 10
Globe Nail Co., Boston, Mass. 28
Pratt & Co., Buffalo, N. Y. 27
Putnam S. S. & Co., Neponset, Mass. 10

Horse Shoes, *Makers of.*
Burden Iron Works, Troy, N. Y. 4

House Furnishing Goods.
Bracher T. W., 77 Greene, N. Y. 31
Tifft & Howard, 12 Murray, N. Y. 30

Hunters.
Parks Bros., Princeton, Ills. 27

Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y. 34

Insurance, Boiler.
Hartford Steam Boiler Inspection and Insurance Co. 33

Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y. 4
Crane U. O., 104 John, N. Y. 4
Hazard & Jones, 204 Pearl, N. Y. 4
Read & Dickey, Cleveland, O. 36

Iron, Corrugated, *Manufacturers of.*
Mosely Iron Bridge and Roof Co., 5 Dey, N. Y. 4

Iron, Charcoal, *Warm or Cold Blast.*
Quincy John W., 98 William, N. Y. 4

Iron Commission Merchants.
Althouse Geo. D., 341 Walnut, Philadelphia 5
Biakiston & Cox, 338 Walnut, Phila. 5
Colt Edward W., 205½ Walnut, Philadelphia 4
Hand Jas. C. & Co., 614 and 616 Market, Phila. 13
Hoopes W. Graham, 419 Walnut, Phila. 5
Malin Bros., 239 Dock, Phila. 5

Iron, Pig, *Importers of.*
Williamson James & Co., 60 Wall, N. Y. 4

Iron Dealers.
Abeel Brothers, 190 South, N. Y. 4
Bonnell, Botsford & Co., Youngstown, O. 4
Borden & Lovell, 70 and 71 West, N. Y. 4
Cleveland, Brown & Co., Cleveland, O. 6
Coddington T. B. & Co., 25 Cliff, N. Y. 4
Conklin & Huerstel, 99 Market Slip, N. Y. 4
Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Fuller, Dana & Fitz, 110 North, Boston 2
Gardner Wm., 575 Grand, N. Y. 4
Harrison & Gilloon, 558 to 562 Water, N. Y. 4
Holden, Hopkins & Stokes, 104 John, N. Y. 4
Jackson & Chase, 206 and 208 Franklin, N. Y. 4
Judson B. F., 467 and 469 Water, N. Y. 4
Matthews Chas. W., 133 Walnut Phila. 5
Mohr J. J., Philadelphia 4
Packard, Goff & Co., Youngstown, O. 4
Pettee & Mann, 258 and 260 South, N. Y. 4
Pierson & Co., 24 Broadway, N. Y. 4
Quincy John W., 98 William, N. Y. 4
Richards D. W. & Co., 22 Mangin St., N. Y. 4
Richardson J. O., 329 Walnut, Philadelphia 5
Smith Gam'l G. & Co., 242 Pearl, N. Y. 4
Stroul Wm. Lawrence, 104 John, N. Y. 4
Wallace Wm. H. & Co., Albany and Washington streets, N. Y. 4
Warner A. B. & Sons, 28 and 29 West, N. Y. 4
Williamson James & Co., 60 Wall, N. Y. 4
Whitney J. E. & Co., 58 Hudson N. Y. 4

Iron, *Manufacturers of.*
Britannia Iron Works, Middlesbro', Eng. 6
Burden Iron Works, Troy, N. Y. 4
Cleveland Rolling Mill Co., Cleveland, O. 6
Coffin Wm. E. & Co., 8 Oliver, Boston 4
Boston Rolling Mills, 17 Batterymarch, Boston 4
Everson, Macrum & Co., Pittsburgh, Pa. 4
Fulton S. & Co., 242 S. Third, Phila. 5
Girard Rolling Mill Co., Girard, O. 6
Leonard John, 430 & 451 West st., N. Y. 4
Milwaukee Iron Co., Milwaukee, Wis. 6
Naylor & Co., 6 Oliver, Boston 4
New Haven Rolling Mill Co., New Haven, Ct. 6
Old Dominion Iron & Nail Works Co., Richmond, Va. 6
Oxford Iron Co., 81 Washington, N. Y. 4
Phœnix Iron Co., 410 Walnut, Phila. 5
Rowland Wm. & Harvey, Phila. 36
Shoenberger & Co., Pittsburgh, Pa. 4

Iron, Swedish, *Importers of.*
Jessop Wm. & Sons, 91 and 93 John, N. Y. 32
Mitander Nils, 69 William, N. Y. 4

Keys and Cutters, *Manufacturers of.*
Barnes Geo. & Co., Syracuse, N. Y. 22

Lace Leather, *Manufacturers of.*
Fales Geo. S., Pawtucket, R. I. 21

Lamps, *Manufacturers of.*
Patent Mechanical Lamp Co., 138 Chambers, N. Y. 34

Lanterns, *Manufacturers of.*
Dietz R. E., (Tubular) 54 and 56 Fulton, N. Y. 36
Howard & Morse, 45 Fulton, N. Y. 2

Lead Pipe, &c., *Manufacturers of.*
Bayley, Farrell & Co., Pittsburgh, Pa. 2

Locks, *Manufacturers of.*
Bohannan Wilson, Broadway and Kossuth, Brooklyn, E. D. 36
Branford Lock Works, Branford, Conn. 30
D. K. Miller Lock Co., 713 Cherry, Philadelphia 36
Romer & Co., Newark, N. J. 11
Trenton Lock Co., 43 Warren, N. Y. 13
Yale Lock Mfg. Co., 296 Broadway, N. Y. 5

Machinery, *Makers of.*
Bement Wm. B. & Son, Philadelphia 35
Chapin Machine Co., New Hartford, Ct. 35
Goodspeed & Wyman, Winchendon, Mass. 34
Pratt & Whitney Co., Hartford, Conn. 34
Sellers Wm. & Co., 1400 Hamilton, Phila. 35
Watson Andrew, 587 Dickinson, Phila. 35
Wetherill Robert & Co., Chester, Pa. 34
Whittier Machine Co., 1176 Front, Boston, Mass. 34
Wood Thomas, 2106 Wood, Phila. 35

Machine Screws, *Makers of.*
American Screw Co., Providence, R. I. 13
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. 32
Rochester Machine Screw Co., Rochester, N. Y. 18

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester Mass. 24
Harrington Edwin & Son, 12th st. and Pa. ave., Phila. 34

Machinery and Tool *Importers of.*
Graham Bros., 122 Cannon street, London, E. C. 33

Mathematical Instruments.
Keuffel & Esser, 111 Fulton, N. Y. 36

Measuring Tapes.
Eddy Geo. & Co., 358 Classon Ave., Brooklyn, N. Y. 27

Meat Cutters. *Makers of.*
Whittemore D. H. Worcester, Mass. 36

Metal Dealers and Brokers.
Coddington T. B. & Co., 25 and 27 Cliff, N. Y. 2
Colt Edward W., 205½ Walnut, Phila. 4
Cort N. L. & Co., 220 & 224 Water, N. Y. 2
Crane U. O., 104 John, N. Y. 4
Gregg H. L. Co., 108 Walnut, Phila. 5
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. 16
Quincy J. W., 98 William, N. Y. 2
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago 3
Thomson A. A. & Co., 213 and 215 Water, N. Y. 2
Van Wart & McCoy, 43 Chambers, N. Y. 2

Metallurgists.
Britton J. Blodgett, 339 Walnut, Phila. 5
Drown Thomas M., Lafayette College, Easton, Pa. 5
Maynard & Van Rensselaer, 24 Cliff, N. Y. 5
School of Mines, E. 49th, N. Y. 5

Mining Spikes
Roseberry Geo. D., Pottsville, Pa. 4

Miner's Candles, *Makers of.*
Joseph Boyd's Sons, 12 Franklin, N. Y. 27

Molding Machines, *Makers of*
Corbin P. & F., New Britain, Ct. 30

Molders' Tools.
Carter R., 290 Pearl, N. Y. 10

Mop Heads. *Manufacturers of.*
Buffalo Hardware Co., Buffalo, N. Y. 3

Mouse Traps. Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 36

Nickel Platers.
Hartman John, 1042 Ridge avenue, Philadelphia 9
New York Nickel Plating Co., 133 West 29th, N. Y. 9

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila. 36

Note Broker.
Gallaudet F. W., 3 and 5 Wall, N. Y. 2

Nuts, Bolts, etc., *Makers of*
American Bolt Co., 210 Lawrence, Lowell, Mass. 13
Arms, Bell & Co., Youngstown, O. 13
Carpenter David, 402 Water N. Y. 4
Clark Bros. & Co., Millsdale, Conn. 12
Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Haskell W. H. & Co., Pawtucket, R. I. 12
Lewis, Oliver & Phillips, Pittsburgh, Pa. 13
Old Colony Rivet Works, 116 Chambers, N. Y. 12
Roseberry Geo. D., Pottsville, Pa. 5
Russell, Birdsall & Ward, Port Chester, N. Y. 36
Plumb, Burdict & Barnard, Buffalo, N. Y. 36
Sternbergh J. H., Reading, Pa. 12
Union Nut Co., 78 Beekman N. Y. 22

Oilers, *Makers of.*
Austin J. & Co., 168 Fulton, N. Y. 12

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia 5

Ore Crushers.
Blake Crusher Co., New Haven, Ct. 34

Packing for Engines, &c., *Manufacturers of.*
Glanding Jas. & Co., 115 Queen, Philadelphia 11

Paints.
Rocky Mountain Vermillion Paint Co., Prov., R. I. 28

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y. .....

Patent Solicitors.
Brieson A. V., 258 Broadway, N. Y. 16
Howson & Son, Phila. and Washington, D. C. 29
Munn & Co., *Scientific American*, 37 Park Row N. Y. 29

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y. 3

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 58 John, N. Y. 27
McNab & Harlin Mfg. Co., 56 John, N. Y. 22
Nelson, Finkel & Co., 439 E. 10th st., N. Y. 22
Pancoast & Maule, 227 Pear, Phila. 22

Pipe Threaders, Cutters, &c.
Converse, M. D., 68 Park Place, N. Y. 22
Empire Mfg. Co., 18 William, N. Y. 9

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y. 6
McNeal John & Sons, Burlington, N. J. 6
Morris, Tasker & Co., 15 Gold, N. Y. 22
National Tube Works Co., 78 William, N. Y. 22
Starr Jesse W. & Sons, Camden, N. J. 6
Warren Foundry & Mach. Co., Phillipsburg, N. J. 22
Wood R. D. & Co., 173 Broadway, N. Y. 22

Piston Packing.
Canfield John & Co., 1321 Fairmount Ave., Phila. 6

Plane Irons, *Manufacturers of*
Buck Bros., Millbury, Mass. 11
H. Chapin's Son, Pine Meadow, Conn 6
Middletown Tool Co., Middletown, Conn. 29

Planes, *Manufacturers of.*
H. Chapin's Son Pine Meadow, Conn. 6
Greenfield Tool Co., Greenfield, Mass. 30
Stanley Rule & Level Co., 35 Chambers N. Y. 22

Plated Ware
Rogers & Bro., 208 Broadway. 11

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y. 26

Plumbers' Materials, *Manufacturers of*
Carr Wm. S. & Co., 106 Centre, N. Y. 22

Portable and Stationary Forges.
Kellogg Wm. P. & Co., 121 Chambers N. Y. 24
Keystone Portable Forge Co., 121 Exchange place, Philadelphia. 6
Manning R. S. & Co., 111 Liberty, N. Y. 6

Presses, Power, *Makers of.*
The Stiles & Parker Press Co., Middletown, Ct. 28

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston 35

Pulsometer Pumps.
Hall C. Henry & Co., 20 Cortlandt, N. Y. 33

Pumps, *Makers of.*
Burlingham & Purdy, 108 Chambers St. 7
Douglas W. & B., Middletown, Conn. 7
Union Mfg. Co., 99 Chambers, N. Y. 7
Valley Mch. Co., Easthampton, Mass. 7

Pyrometers.
Brown Edward, 311 Walnut, Phila. .....

Railroad Supplies.
Potter Hoffman & Co., 110 Liberty, N. Y. 6

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y. 32

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 3
Cleveland Rolling Mill Co., Cleveland, O. 6
Girard Old John A. & Co., Troy, N. Y. 32
Milwaukee Iron Co., Milwaukee, Wis. 6

Razor Straps, *Makers of.*
B. F. Badger, Charlestown, Mass. 5

Revolvers.
Tryon E. K., Jr., & Co., 220 N. 2d, Philadelphia 20

Rivets.
Old Colony Rivet Works, 116 Chambers, N. Y. 12
Timmes Peter, 281 North 6th, Brooklyn, E. D. 4

Road Scrapers, &c., *Makers of.*
Revolving Scraper Co., Columbus, O. 23

Rolling Mill Machinery, etc., *Manufacturers of.*
Birmingham Iron Foundry, Birmingham, Ct. 4
Moore James, Cor 16th and Buttonwood, Phila. 29

Rules, *Manufacturers of.*
H. Chapin's Son, Pine Meadow, Ct. 6
Stanley Rule and Level Co., 35 Chambers St. 22

Sash Weights (sectional), *Manufacturers of.*
Sprague Sash Weight Co., Youngstown, O. 3

Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind. 10
Boynton E. M., 80 Beekman, N. Y. 10
Flint J. & Co., Rochester, N. Y. 10
Disston Henry & Sons, Phila. 28
James Ohlen, Columbus, O. 10
Peace Harvey W., Williamsburg, N. Y. 10
Spear & Jackson, 116 Duane, N. Y. 29
Wheeler, Madden & Clemson, Middletown, N. Y. 10

Saw Frames, Wood, *Makers of.*
Boynton E. M. 80 Beekman, N. Y. 10
Peace Harvey W., Williamsburg, N. Y. 10

Scales, *Manufacturers of.*
Richie Bros., 9th near Coates, Phila. 38
Shattuck W. F. & Co., 113 Chambers, N. Y. 8
Universal Family Scale Co., Guilford, Conn. 15

Screws, *Makers of.*
American Screw Co., Providence, R. I. 13
Miles F. S., 206 Quarry, Phila. 12

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 5
Plein Alfred & Co., 98 Chambers, N. Y. 9
Guental George & Son, 39 W. 4th, N. Y. 10

Shovels, &c.
Clement & Hawks Mfg. Co., Northampton, Mass. 8
Middleboro Shovel Co., 63 Oliver, Boston 30
N. Y. Shovel Works (Screening Shovels), 1258 Broadway, N. Y. 8

Skates.
Barney E. H., Springfield, Mass. 3
Florence Sewing Machine Co., Florence, Mass. 13
Graham & Haines, 88 Chambers, N. Y. 30
Patterson Bros., 27 Park Row, N. Y. 27
Peck & Snyder, 126 Nassau, N. Y. 9

Smelting Works.
Reeves Paul S., 760 South Broad St., Phila. 36
Du Plaine & Co., 1305 & 1305 Buttonwood, Phila. 9

Stamped and Japanned Tin Ware.
Schelder Jos. & Co., 58 Beekman, N. Y. 6
Shepard Sidney & Co., Buffalo, N. Y. 27
Sturges Frank & Co., 72, 74 & 76 Lake, Chicago 3

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y. 34

Snaps, Harness. *Makers of.*
Middletown Tool Co., Middletown, Conn. 29

Spiegel.
Quincy John W., 98 William, N. Y. 2

Spikes, R. R. &c., *Manufacturers of*
Fahrion, G. W., Niles, Ohio 4
Starke Adolph, 441 East 10th, N. Y. 4

Springs.
Rowland Wm. & Harvey, Frankford, Phila. 36
Schenck & Sheridan, Fulton, N. Y. 20

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y. 30

Steam Pumps, etc., *Manufacturers of*
Carr A. 43 Cortlandt, N. Y. 28
Enterprise Hydraulic Works, 2218 Race St., Phila. 34
Guild & Garrison, Williamsburgh, N. Y. 34
Hall C. Henry & Co., 20 Cortlandt, N. Y. 34
Philadelphia

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ROCHESTER, N. Y.

Depot for New York City Delivery, with UNION HARDWARE CO., 120 Chambers, and 50 Warren Street.

COPAL VARNISHES, THE LONDON MFG. CO., DAZZLE BLACK BAKING JAPANS, CELEBRATED BRUNSWICK BLACK VARNISH, &c. HYATT & CO.,

These Varnishes compare favorably in price, and are unexcelled for their purity, durability, and color. Contain no **Coal Tar, Coal Gas,** nor deleterious substances, BUT ARE MANUFACTURED FROM PURE GUMS. PROPRIETORS.

Office, New York. 246 Grand St. **Factory, Newark, N. J., 113 Chestnut St.**

Wire Rope Manufacture.

The manufacture of ropes of iron wire is a comparatively new industry; but it may be regarded as not one of the least important signs of the tendency, well marked in other departments, to substitute iron for other materials in all constructive works. It is a good many years since wire began to take the place of hempen ropes, as well as of iron chains, for mining purposes, and wire ropes before long will probably have displaced those of vegetable fibre in the standing and other rigging of ships, just as iron masts have in many cases superceded the pine stems "fit mast for some tall admiral." Wire ropes are now used for winding and for hoisting of every description, for moving steam plows, for ships' rigging, for transmitting power instead of belts; and, latterly, they have been made so limp and pliable that they have in many instances taken the place of the hemp ropes which used to have the preference in working over small pullies.

Among the industrial firms engaged in this manufacture, a foremost place is taken by the Warrington Wire Rope Company, Limited. Originally commenced at Queensferry, in Flintshire, in 1852, the works now in the possession of the company were transferred about five years ago to Warrington, in Cheshire, as, from its proximity to the consumer, a more convenient site for the industry; and there the company reared spacious premises, occupying an area of an acre and a half, and provided with all the requisite machinery for what was then a large, and is now a still larger and increasing business. Recently they have also established extensive warehouses and workshops in Liverpool, the work in that branch being mainly that of rigging ships with wire ropes.

The principal business of the chief establishment at Warrington is the making of colliery wire ropes, a branch requiring even more care in the workmanship, and in the selection of proper material, than the marine department. Not only is great care required in testing the wire employed in colliery ropes, but it is necessary to secure the complete welding of the various coils where they are joined to complete the required lengths of the strands. At the Warrington Company's works this operation is effected in a very ingenious way, by the use of the hydrogen blow-pipe. The manufacture of the hydrogen gas is carried on to an extent suitable to the exigences of the establishment in a shed on the ground floor, contiguous to the strand spinning room, by treating zinc with muriatic acid. The gas so generated is conveyed in pipes to the different spinning rooms, and to each set of stranding machines a bench is fitted up with several blow pipe-nozzels, the stop-cocks of which, on being opened, emit a stream of hydrogen, which, being ignited, gives a very intense heat, and the ends of the wire to be joined being subjected to it, with the addition of a little borax as a flux, the welding process is speedily and most efficiently completed.

The process of spinning may be now described. In nearly all kinds of wire rope, the strands, as well as the ropes formed of the strands, are constructed round a hempen core for the wire envelope to rest on. The hemp used for this purpose is kept in a store on the right-hand side of the gate at the entrance, in immediate contiguity with the wire rope, where it is spun into yarn. The hemp is received in bales, and about 200 tons of this material are annually used in the works. When it has been spun into warps, or cores, as they are called, they are passed through tar contained in a trough or pan, by which they are saturated, the excess of tar being pressed out. The smallest of these cores are then taken to the wire stranding machines, by which they are covered with wire, and thus constituted a wire rop strand. The strands are next transferred to the rope spinning machine, by which they are spun, or, as it is called, laid round a larger hempen core, and when this has been completed the round wire rope may be considered as finished. The spinning machinery employed at the Warrington Works is of a complex and highly scientific character, and does its office with the utmost regularity and exactness. Most of the machines work vertically, and they consist of a series of bobbins which have been filled with wire, and these bobbins revolve round a central shaft on what is called the sun and planetary motion, each bobbin having a double motion, one round its own axis, and the other round the central shaft. The leading advantage of this double rotatory motion is that the while wire is drawn off the bobbin to be absorbed round the core, it is never strained or twisted. The same principle is observed in the larger or rope spinning machinery. In the Warrington establishment there are sixteen of these stranding machines, and four of the large rope making machines, beside two small delicate machines for making sash cord and picture cord. The rope making machines are of large capacity, capable of making a rope six and a half inches in circumference, one coil of which, recently sent to America, weighed nine tons. The same machine has been proved in its capacity by the laying together six rods or bars of iron three-eights of an inch in thickness round a steel core or center, intended as a guide up and down a colliery shaft to keep the coal cage in its proper position in ascending and decending, and to prevent its coming in contact with the sides of the shaft. It has also made a rope two inches in diameter, intended for the main lines of a suspensory tramway, to act as the rails of the tramway on which the wheels are to run, the cars themselves being propelled, or, to speak more correctly, impelled by an iron wire rope of about half the above named diameter.

Small flexible ropes are largely manufactured at Warrington for the American markets for use as sash and picture cord and clothes lines. The quantity of wire rope of all kinds turned out annually from the Warrington Works is about 2000 tons.

Flat ropes for mining purposes consitute, as has already been intimated, the leading branch at the Warrington works. They are made by taking a number of round ones of a given strength and thickness. These are laid together and placed on a frame which has movable cheeks, which can be adjusted to grasp firmly the whole width of the intended flat rope or band. The different strands of the round ropes are then to some extent forced open by a bodkin-like instrument which has a hook at its point. This bodkin has then a sort of needle attached to it, through one eye of which wire is thread to the required number of threads; the other eye of the needle is then fixed to the hook of the bodkin, and is drawn through the widened strands of the round ropes; and this process is called stitching, but is in realty weaving, the wires thus drawn though constituting the woof of the ponderous iron web. The web is drawn gradually forward by a pair of cylindrical rollers which, revolving in opposite directions, draw the web onward as the weaving process is proceeded with, until the required length of rope is completed. All the processes referred to, but particularly the stitching or weaving, have to be executed with great care in order to secure a regular and even strain to each rope strand, and even wire. The process last referred to is peculiarly difficult of execution and can only be entrusted to men who have been specially trained to the work. It requires much nicety in adjusting, with complete regularity, the stitches throughout the whole length of the rope, so that it will hang perfectly flat when it is over the shaft of the mine at which it is intended to be worked. Any inequality or carelessness in the stitching would have a tendency to make the rope twist and cackle, and by working irregularly destroy itself in a short time. These flat ropes are always ponderous, and often of great length. One recently made is 700 yards long, and weighs about four tons. It was formed by stitching or weaving together eight of the completed round wire ropes.—*Iron.*

A new alloy for bearings, known as the Graupen anti-friction metal, is now largely used in Germany. The manufacturers say it is applicable to all purposes for which anti-friction metals have been employed, and it stands alike the test of great pressure and high velocity. They also state that numerous heavy and quickly revolving journals, mounted with this metal, have been worked for some considerable time past in industrial establishments without showing any perceptible wear; and certainly the testimonials which they present from those who have employed it in Germany and Austria would tend to bear out their assertions. Where the best descriptions of bearings stand the wear and tear a short time only, this metal, we are informed, shows scarcely any alteration. It can be adapted in the usual manner to all ordinary bearings, and owing to its being easily fused—the melting point being low—it can be run round the journal in a melted state, which renders it peculiarly adaptable to heavy machinery. The metal has been used in Prussia and Austria on the axles of goods wagons, and not a single one of the wagons has got heated or shows any wear and tear, although they have run regularly all this year. The Tephtz Railway Company are using it for fitting locomotive eccentrics, and it is also being employed in rolling mills. On the Upper Silesian Railway, four wagons have run about 10,000 miles without showing any defect.

An Early Opinion of Railways.—A copy of the English *Quarterly Review* of the year 1819, contains an account of a scheme for a railroad, on which it is proposed to make carriages run twice as fast as stage coaches. The editor evidently failed to appreciate the idea, or to believe in its possibility, for he comments upon it thus wise: "We are not partisans of the fantastic projects relative to established institutions, and we cannot but laugh at an idea so impracticable as that of a road of iron upon which travel may be conducted by steam. Can anything be more utterly absurd or more laughable than a steam propelled wagon moving twice as fast as our mail coaches? It is much more possible to travel from Woolwich to the arsenal by the aid of a Congreve rocket."

Send 50 cents for 6 samples of

HAMMOND'S WINDOW SPRINGS,

For supporting and locking upper and lower sashes of all windows. Not a coiled spring, but one *forged* from best materials. W. S. HAMMOND, Lewisberry, York Co., Pa.

MORE LIGHT, LESS OIL AND NO CHIMNEYS.

THE PATENT

Mechanical No Chimney Kerosene LAMP.

Equal to Gas, No Smoke, No Smell, Guaranteed cannot Explode. Send for Circular. Liberal discount to Trade.

PATENT MECHANICAL LAMP CO., 138 Chambers Street, New York.

NEW YORK SCREW BOLT WORKS.

(Estate of R. J. DEWHURST, deceased.)

JOHN COCHRANE, Executive Agent and Manager,

Office and Works, cor. Ave. D and 11th St., N. Y.

Bolts, Nuts, Turnbuckles, Washers, Forgings, &c

The attention of large consumers solicited.

HENRY DISSTON & SONS,

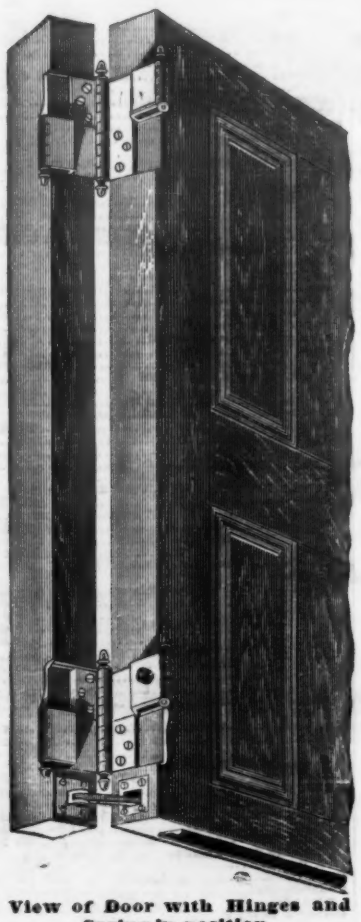
Keystone Saw, Tool, Steel and File Works,

Front and Laurel Streets, Philadelphia.

Branch Works, Tacony, Philadelphia. **Branch House, Randolph & Market Streets, Chicago, Ill.**

MANUFACTURERS OF

Barker's Patent Double Reversible Joint Butt Hinges and Concealed DOOR SPRINGS.



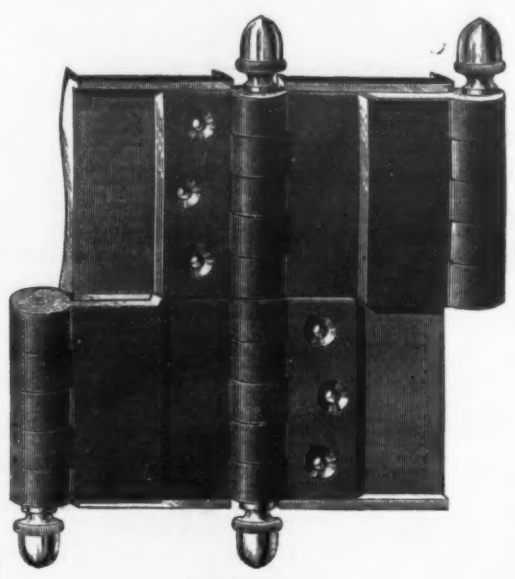
View of Door with Hinges and Spring in position.

THE BEST IN THE UNIVERSE.

Always Reliable.

THEY NEVER GET OUT OF ORDER,

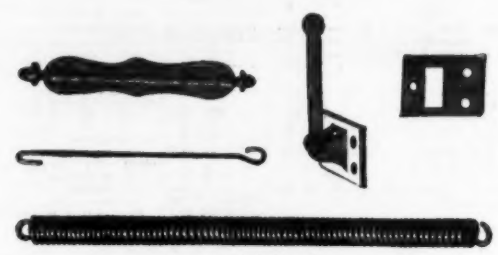
And give Unbounded Satisfaction wherever they are Used.



Butt Hinge.

Henry Disston & Sons desire to call the attention of the Hardware Trade; also Architects, Builders, Carpenters, and all parties interested, to the

PATENT REVERSIBLE BUTTS



Concealed Spring.

represented in the annexed engravings.

For the doors of Churches, Schools, Theatres, Banks, Factories, Public Buildings, Hotels, and all places where it is necessary or desirable to swing a door both ways, these Hinges are vastly superior to all others. The neatness of the Butt and the simplicity of its construction make it far more desirable than most of the uncouth and unwieldy hinges now in common use. The concealed spring is the strongest, most durable, and the simplest, consequently the least liable to get out of order.

It is the *neatest*, and being concealed, does not present that unsightly appearance which usually so disfigures doors that have Springs.

It relieves the Butts of the weight of the door, and consequently adds to the strength.

It prevents the door from sagging.

It is more readily applied and easily disengaged, and is altogether the most effective, convenient and elegant Spring that has ever been offered to the public.

Every Spring has been thoroughly tested, is warranted, and will bear twice the strain that is ever applied to a door.

It is by far the cheapest, as a reference to the PRICE LIST will at once show.

PER SET, WITH SPRINGS COMPLETE.

No. 0, Japanned with Plated Acorn Tips and Plates, for 1 inch doors		No. 5, Japanned with Plated Acorn Tips and Plates, for 2 1-4 inch doors	$6 75
" 1, " " " " 1 1-4 "	3 50	" 6, " " " " 2 1-2 "	12 00
" 2, " " " " 1 1-2 "	3 75	" 7, " " " " 2 3-4 "	13 75
" 3, " " " " 1 3-4 "	4 50	" 8, " " " " 3 "	15 00
" 4, " " " " 2 "	5 25	Brass Butts made to order.	

BARKER'S PATENT CONCEALED DOOR SPRING.

No. 1, Japanned, for ordinary doors - - - - - - per dozen	$5 00	No. 4, Japanned, for heavy doors - - - - - - - per dozen	$6 50
" 2, " " " - - - - - - "	5 50	" 5, " extra heavy doors - - - - - - "	7 00
" 3, " heavy " - - - - - - "	6 00	**Send for Circulars.**	

New York Wholesale Prices, December 16, 1874.

HARDWARE.

Anvils.
Solid Cast Steel.....₩ ℔ 14c
Wright's.....₩ ℔ gold 11¾c; over 250 ℔s 12c, gold
Armitage's Mouse Hole.....gold 11c
Wilkinson's.....₩ ℔ gold 11c
Eagle Anvils, ₩ ℔ 11c currency.....dis 15&10 %

Apple Parers.
Domestic.....
Corn Table.....
Lightning.....
Hudson's.....} $7 @ 9 ₩ doz
Reading.....
Union.....
Skeleton Paring, Coring and Slicing.....

Turn Table, old style.....$6 75 dis 10 %
Bay State, Paring, Coring and Slicing.....$15 00 dis 10 %
Cliftax Slicer.....8 00

Augers and Bits.
Douglass.....
Ives.....
Beecher(French,Swift&Co).....1st quality.....dis 40 %
Griswold.....2d quality.....dis 40&5 %
Notbie.....
Challenge.....dis 40&10 %
Snell Mfg. Co.....dis 15 @ 20 %
Russell Jennings.....dis 10 %
Lewis' Single Twist Bits.....dis 30 %
Andrews' Bits.....dis 25 %
Cook's Bits.....dis 40&10 %

" " Augers.....dis 50 %
Expansive Bits, Clark's.....$18 @ $26—dis 15 %
" " Ives'.....$30 @ $30—dis 20&10 %
" " Blake's.....$30—dis 25&10&10 %
Hollow Augers, Douglass'.....dis 25&10 %
" " Ives'.....dis 25&10 %
" " French, Swift & Co.....dis 25&10 %
" " Bonney's Adjustable.....₩ doz $48—dis 25 %
" " Stearns'.....₩ doz $48—dis 25 %
" " Ives' Expansive.....each $4 50—dis 40 %
" " Cushman's Expansive.....dis 20 %
Double Cut Gimlet Bits, Shepardson's.....dis 20 %
" " Hartwell's.....dis 50 %
" " Douglass'.....dis 20&10 %
" " Ives'.....dis 25 %
" " Ladd's.....dis 50&10 %
Griswold's Patent.....dis 20 %
Gimlet Bits—Screw, $7 50; no screw, $9.....dis 40 %
Morse's Bit Stock Drills.....dis 20 %
L'Hommedieu's Ship Augers.....dis 15 %
Watrous Ship Augers.....dis 15 %
Vaughan's Post Hole—
6 in. $23 60; 9 in. $25 per doz.....dis 20 %

Awls and Tools.
Aitken's.....dis 35 %
Nos. 4½ and 45.....dis 35&10 %
Clark's.....dis 30&10 %

Axes.
Brook's.....per doz $12 00 @ 14 00 net
Hood's.....per doz $12 00 @ 13 00
Hunt's.....₩ doz $12 50 @ 14 00
Collins'.....₩ doz 11 00 @ 15 50 net @ dis 5 %
Hurd's.....₩ doz 11 50 @ 12 50
Simmons'.....₩ doz 11 00 @ 11 50
Morris'.....₩ doz 12 50 @ 13 50
Red Jacket.....₩ doz 12 00 @ 12 50
Mann's.....₩ doz 11 50 @ 13 00
" Double Bitted.....₩ doz 21 50 @ 22 00
Underhill's.....₩ doz 12 00 @ 13 00
" Crown.....₩ doz 12 50 @ 13 50
John Leverett's.....₩ doz 12 50 @ 15 50
Ten Eyck.....₩ doz $11 00 @ 13 50 net
.....dis 40&10 %

Balances.

Bands.
Plated.....new list dis 50&5 %
Iron (Dim.).....new list dis 25&5 %
Brass (Plated list).....new list dis 50, 10&5 %
Oroide.....new list dis 50&5 %

Bells.
Hand, Light Brass.....dis 65&5&10 %
" Extra Heavy.....dis 40&10 %
" White Metal.....dis 50&10 %
" Silver Chime.....dis 15&10 %
" Swiss.....dis 25 %
" Globe.....dis 15&10 %
Gong, Abbe's.....dis 15&10 %
" Yankee.....dis 20&10 %
" Barton's.....dis 25 %
Crank, Taylor's.....dis 20&10 %
" Crook's.....dis 50 %
" Cone's.....dis 10 %
" Connel's.....dis 50&10&10 %
Lever, Sargent's.....dis 50&10&10 %
" Taylor's.....dis 25 %
" Hart, Bliven & Mead Mfg. Co.....dis 50&10 %
Pull, " " " " .....dis 50&10 %
" Brook's.....dis 50 %
" Western.....dis 25 %
Cow—Common Wrought.....dis 20&10 %
Western.....dis 20&10 %
" Sargent's.....dis 50&10&10 %
Kentucky "Star".....dis 20&10 %
" Sargent's.....dis 50&10&10 %
Dodge's Genuine Kentucky.....dis 25 %
Yaw's Genuine.....dis 30 %
Texas.....dis 33 %
Cast.....dis 15 %

Bellows.
Blacksmiths'.....dis 20 %
Moulders'.....dis 15 %
Hand Bellows.....dis 10 %

Blind Adjusters.—Domestic.....₩ doz $3—dis 20 %

Blind Fasteners.
Mackrell's.....dis 30 %
Van Sand's, No. 2003, $14 00; No. 3705, $10 75.....net
Washburn's Patent.....₩ gross 14 00
Merriman's.....new list net

Blind Staples.
Boardman's Patent, ¼ in. and larger.....₩ ℔ 8; c
" ⅜ in....." 42 c

Blocks.
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list.....dis 30 %

Bolts.
Cast Iron Barrel, Shutter, &c.....new list dis 60, 10&10 %
Wrought Iron Barrel.....new list dis 50, 10&10 %
" " Square.....new list dis 50, 10&10 %
Wrought Iron Flush.....dis 15&10 %
Carriage and Tire, Common.....dis 35&10 %
" " " Norway Iron.....dis 50 x 10 %
Star, Philadelphia.....dis 50 @ 50&10 %
Eagle, Philadelphia.....dis 50 @ 50&10 %
Carriage and Tire, R. B. & W.....old list dis 50&10 %
Plow, ¾ B & W.....dis 30 %
Stove, R. B. & W.....dis 20 %
" Shelton Co. Shaved Heads.....dis 20 %
Union Nut Co., old list.....dis 50&2&10 %
" " Stove.....dis 15 %
" " Machine.....dis 45& 0 %

Borax.

Boring Machines.
Kellogg's.....dis 15 %
Snell Mfg. Co., Rice's Patent.....dis 20 %
" " Regular.....dis 20 %
Douglas Mfg. Co.....dis 20&10 %
Mortising Machines each.....$18 00

Bow Pins.
Union Nut Co.....new list dis 50&10&5 %
Hotchkiss'.....dis 50 @ 5 %
Humason, Beckley & Co.'s.....dis 50&10&5 %
Sargent & Co.'s.....dis 50&10&10 %

Braces.
Barber's Patent.....dis 40&5 %
Q. S. Backus.....dis 4&10 %
Wilson Mfg. Co.....dis 10 %
Spofford's Patent.....dis 40&5 %
Noble's Patent.....dis 40&5 %
Bartholomew's American Ball.....dis 15&10 %
" Patent Grip.....dis 40&5 %
Ives' Novelty.....dis 40&5 %
" Hamden.....dis 15&10 %
Common Ball.....dis 15&10 %

Brackets.—Shelf.....dis 60&10 @ 65&10 %

Bull Rings.—Union Nut Co., new list.dis 50&10&5 %
Sargent's.....dis 60&10 %

Bung Hole Borers.
Common and Ring.....dis 75 %
Ives' Tap Borers.....dis 10&10 @ 25 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co.....dis 20&10 %
Bradley's.....dis 25 %
Beatty's.....new list dis 20 %

2	3	4	5	6	7	8	9
$19 00	$21 50	$24 00	$27 00	$30 00	$32 50	$36 50	$40 00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$25 25	$29 75	$34 25	$38 75	$43 21	$48 50	$54 00

Butts.
Wrought Brass.....dis 30 %
Cast Fast Joint, Narrow.....dis 40 @ 50&5 %
" " Broad.....dis 50&10 %
Cast Loose Joint, Narrow.....dis 55&10 %
" " Broad.....dis 60&10 %
" " Mayer.....dis 50 %
" " Parliament.....dis 50 %
Drilled Wire Jointed—
Narrow, High List.....dis 55&10 %
Broad.....dis 50&10 %
Loose Joint.....dis 60&10 %
Loose Pin.....dis 5&10 %
Wrought Fast Joint, Narrow.....dis 30&10 %
Wrought Broad.....dis 35&10 %
" Loose Joint.....dis 35&10 %
Wrought Table and Back Flaps.....dis 3&10 %
Lull & Porter's Blind Butts.....dis 10 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 40&10 %
Parker's Blind Butts.....dis 55&10 %
Huffer's Blind Butts.....dis 33½&10 %
Clark's Surface Blind Hinges, Nos. 1, 2 and 5...dis 5&10 %
" " " " No. 40 and 50.....dis 50&5 %
" " " " No. 20.....dis 6&10 %
" Mortise " " 2, 4, 4½, 6, 8, 10...dis 33½ %
Seymour's.....dis 55&10 %
Shepard's.....dis 5&2&5 %
Carrerson's.....No. 1, dis 5&10 %; Nos. 2 and 7 dis 50&5 %
The American Spiral Spring Butt Co.....dis 20 %
Standard.....dis 30&5 %

Caps—Percussion, per 1000.
G. D.....37 @ 40c
Ely's E. B.....1-4s, 55c.; 1-10s, 45c., gold
" Double Waterproof, 1-4s, $1 45; 1-10s, $1 52½c., gold
Colt's.....1-10s 70c., gold

Carpet Sweepers.
Dillon.....each $2 75 net
Welcome.....each 2 75 net

Cartridges.
Metallic.....dis 50&10 %

Cards.—Horse and Curry.....dis 30&10 %
Cotton.....dis 10&10 %
Wool.....dis 15&10 %

Carpet Stretchers.
P. S. & W.....per doz $2 00; dis 40&5 %
Sargent's.....per doz $4 88—dis 50&10&10 %

Casters.
3cd.....dis 30&10 %
Plate and Shallow Socket.....dis 40&10 %
Deep Socket.....dis 33½ %

Cattle Leaders......new list dis 60&10 %

Chain

Engnsh Coil						net gold
₩	.15	9¾	8¾	8	7¾	7½c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2.....by the cask, ₩ pair, gold 57c
Trace, 7-10-2.....by the cask, ₩ pair, gold, 62c
Galvanized Pump Chain.....₩ ℔ 13c
German Halter Chain.....new list, Jan. 1, dis 25 %
German Coil.....new list, Jan. 1, dis 25 %
Jack Chain, Iron.....dis 50 %
" Brass.....dis 40 %

Chalk.
White.....₩ gross, 63c net
Red.....₩ gross, 90c net
Blue.....₩ gross, $1 71 net
Crayons.....₩ gross, 16¼c net

Chiseels.
Socket Framing, Douglass.....dis 60&10 %
" " Crossman.....dis 50&5&10 %
" " Hart Mfg. Co.....dis 60&10 %
" " Merrill.....dis 60&10 %
" Firmers, Douglass.....dis 50&10&10 %
" " Crossman.....dis 50&5&10 %
" " Hart Mfg. Co.....dis 60&5 %
" " Merrill.....dis 60 %
Socket Corner.....dis 50&10 %
Tanged Firmers.....dis 45&10 %
Butcher's.....$5 50 to £ gold
Newbould's.....$5 50 to £ gold
Spear & Jackson's.....$5 50 to £ gold

Clamps.
Cabinet.....dis 60&10 %
Judd's.....dis 45&10 %
Lambert's.....dis 30 %
Providence Tool Co.....dis 10 %

Clips, Axle.
Norway or Best.....dis 30 %
Superior.....dis 50 %
"Star," Superior Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₩ doz, $ 85 @ 1 25
Wooden Handled.....₩ doz, 1 00 @ 2 00

Coal Hods.—Smith, Burns & Co.....dis 15 @ 25 %

	14	15	16	17	18	inch.
Japanned	$6 00	$ 25	$ 75	7 50	8 00	per doz.
Galvanized	9 30	10 00	10 75	11 50	12 50	"

Morning Glory Funnel Hods—

	No.	15	16	17	
Japanned		$9 00	10 50	12 00	per doz
Galvanized		13 00	14 50	16 00	"

Sidney Shepard & Co.'s new list.....dis 10 %

Cockeyes......1½ in., 34c.; 1¾ in., 38c.; 1¾ in., 42c. net

Cocks.
Brass Racking.....dis 20&10 %
Lock and Globe.....dis 2 &10 %
Lever Bibbs.....dis 20&10 %

Coffee Mills.
Board and Box.....dis 15 %
Increase Wilson's.....new list dis 15 %
Selsor's Pat.....$9 50, $10 50—dis 25 %
French Steel.....dis 15 %
The Swift.....dis 25 %

Compasses and Dividers.
Bourls.....dis 35 %
Cook's.....dis 15 %
Excelsior.....dis 50 %
Peck Stow & Wilcox.....dis 35 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 20 @ 25 %
Swan & Brombacher.....dis 15 @ 20 %

Corkscrews......dis 25 %

Corn Knives and Cutters.
Bradley's.....dis 10 %

Crow Bars.
Cast Steel.....₩ ℔ 11c. net
Iron, steel points.....₩ ℔ 6c

Crucibles.
Gautier & Co.'s.....₩ No. 5½c

Curling Irons.—⅜ in., $1 50; ⅝ in., $2; ¾ in., $2 40.....dis 10 %

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass....dis 20&10 %
Fitch's.....dis 15&10 %
Rubber.....₩ doz, $2 00—dis 15 %
The Lawrence Curry Comb Co.....dis 40 %

Curtain Pins.—Silvered Glass.....old list dis 52½ %

Cutlery,
American Table.....net list
American Pocket.....dis 25 %
Am. Pocket—Humason & Beckley Mfg. Co...dis 20&10 %

Dippers.
Britannia.....per doz 7 50—dis 30 %; by bbl, dis 33½ %
Cocoa, Plain.....per doz $3 25—dis 20 %
" Rimmed.....per doz 3 75—dis 20 %

Dog Collars.
Embossed Gilt.....dis 20 %
Leather.....dis 20 %
Brass.....dis 25 %

Door Springs.
Gray's.....$7 50 ₩ doz—dis 50&10 %
Torrey's Patent.....$7 50 ₩ doz—dis 55 %
Palmer's Japanned No. 6.....₩ doz $5 00 } dis 20 %
" Coppered " " " 6 00 }
" Silvered " " " 8 00 }
Challenge.—
Japanned.....₩ doz $4 00 @ 6 00—dis 40 %
Gem.—No. 1 large, Japanned.....per doz $4 00
No. 2 medium.....per doz 3 00
No. 3 small.....per doz 2 00
In Gross Lots.....dis 10 %

Drawing Knives.
Crossman's No. 1.....dis 50&5&10 %
Douglass.....dis 60&10 %
Hart Mfg. Co., No. 1.....dis 60 %
Merrill.....dis 60&10 %
Bradley's.....dis 25 %
Adjustable Handle.....dis 15 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %
Whitney's Ratchet.....dis 20 %
Blacksmiths'.....each $2 00 net
Breast, P. S. & W.....dis 15&10 %
" Miller's Falls.....dis 25 %
" Aiken's.....$2 50; 4 00, dis 40 %

Drill Chucks.—The Danbury...each 10 00, dis 25 @ 30 %

Egg Beaters.

Monroe's.....	8 in.	10 in.
	Per doz $8 00	9 00

.....dis 10 %
Dover.....₩ doz net $6 00
National.....₩ doz $4 50—dis 20 %
Peerless.....₩ doz $4 00—dis 10 %

Emery.
Genuine Chester—Regular Nos.....₩ ℔ 7c } dis 10 %
" " Flour and FF.....₩ ℔ 8c }
Washington Mills—Regular Nos.....₩ ℔ 8c
" " Flour.....₩ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 35 %
Sauce Pans.....dis 25 %
Glue Kettles.....dis 30 %
Tinned Saucepans.....dis 25 %

Escutcheons.
Brass Thread.....dis 60&10 %
Wood.....dis 25 %

Faucets.
Cork Lined, Wood.....dis 60&10 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 15&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Felloe Plates......₩ ℔ 14c; dis 10 %

Files.
American File Co.....$5 00 to £ currency—dis 10 %
Nicholson.....$5 00 to £ currency—dis 12½ & 5 %
" Tapers.....dis 12½&5 %
Hartford File Co.....$5 50 to £ currency—dis 10 %
Newbould's.....5 25 to £ gold
Rothery's.....$5 to £ currency
J. & Riley Carr.....5 25 to £ gold
" " Horse Rasps.....5 50 to £ gold
Stubs'.....5 50 @ 9 00 to £ gold
Butcher's.....5 25 to £ gold
Walter Spencer & Co.'s "Diamond".....5 25 to £ gold
Spear & Jackson's.....5 00 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 to £ gold
R. Ibbotson.....5 00 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.)5 00 to £ gold
" " Horse Rasps.....5 25 to £ gold
"Philo Sheffield." P. T. Co.....5 00 to £ gold

Fluting Machines.
Mrs. Coles, 7 inch rolls.....6 50
" " 5 " 5 50
Knox, with 4-inch Rolls.....4 40 each net
" " 6 " .....5 25 each net
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....4 75 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....5 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4½-inch Roll.....3 50 each dis 15 %
" 6-inch Roll.....6 00 each dis 15 %
Myers Fashion Fluter, 4½ inch Rolls.....3 00 each net
" Convex Brass Fluter, Sad Iron attachment..$1 75
Domestic Fluter.....$1 75 each net
Fairy, Self-Heater.....8 00 each net
Geneva Hand Fluter.....$15 00 per doz net
Champion, 4 inch rolls.....$2 00 each dis 10 %
4 inch rolls.....$2 40 each dis 10 %

Fluting Scissors......dis 25&10 %

Forges.
"Empire" (W. P. Kellogg & Co.).....dis 30 %

Forks.
Hay, Manure & Spading.....dis 30 %
Plated A 1.....dis 40, 10&5 %

Fry Pans.
Burnished, P. S. & W.....dis 30 %

₩ doz.....	$2 80	3 00	3 25	3 75	4 12	4 50	5 00	5 62	6 75
No.	0	1	2	3	4	5	6	7	8

Smith, Burns & Co., "Excelsior" Polished.....dis 35 %

₩ doz.....	$3 70	4 00	4 70	5 30	6 00	7 00	8 00	9 00
No.	1	2	3	4	5	6	7	8

Gas Stoves.
Tiffi & Howard.....dis 20 %

Gauges.
Marking.....dis 4&10 %
Wire.....dis 10 %

Gimlets.—Metal and Wood Head.....dis 25&10 %
Grind Stones.—J. F. Green & Bro.....dis 20 %

Grind Stone Fixtures
Sargent's Patent.....dis 65&10 %
Reading Hardware Co.....dis 66⅔&7½ %
Hart Mfg. Co.'s.....dis 60&5&10 %

Hammers.
Emmet Hammer Co.'s Handled.....dis 25 %
" " Sledge & Stone..₩ ℔ 25 @ 30c net
Humason & Beckley Mfg. Co.....dis 16⅔&10 %
Maydole's, new list.....dis 5 %
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....dis 12½ %
Magnetic Tack.....dis 2&10 %
Warner's.....list net

Hand Cuffs and Leg Irons.
Tower's.....dis 25 %
Providence Tool Co.'s Hand Cuffs $15 per doz } dis 10 %
" " Leg Irons.. 25 " }

Handles.
Wrought Chest.....dis 60&10 %
Surface Chest.....dis 65 x 10&10 %
Flush Chest.....dis 60&10&10 %
Lifting.....dis 60&10 %
Coffin.....dis 50&10 @ 60&10 %
Saw and Plane.....dis 20&10 %
Hammer and Hatchet.....dis 10 %
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %
Woolworth Axe, Pick and Sledge.....dis 10 %
Brad Awl.....per gross $3 50—dis 2&10 %
Hickory Firmer Chisel, ass'td " 5 25—dis 10&10 %
" " " large " 6 25—dis 10&10 %
Apple " " ass'td " 6 00—dis 10&10 %
" " " large " 7 00—dis 10&10 %
Socket " " ass'td " 3 50—dis 10&10 %
" Framing " " " 6 00—dis 10&10 %
Flie....." " " 3 50—dis 10&10 %
Auger " " " 5 50—dis 10&10 %
" large " 6 50—dis 10&10 %

Hangers.
Barn Door.....dis 65 x 10 %
"Anti-Friction" (Rider, Wooster & Co.).....dis 30 %
Novelty.....dis 30 %

Harness Snaps.
Henshaw's.....dis 25&10 %
Judd's.....dis 40 %
Fitch's (Bristol).....dis 30 %
Hotchkiss'.....dis 10 %
Andrews'.....dis 25 %
Sargent's.....dis 50&10 %
New York Wire.....dis 20&20 %

Hatchets.—Isaiah Blood.....dis 10 %

Shingling, Nos. 1 2 3.....	₩ doz	$7 50	8 00	8 50
Claw, " 1 2 3.....	₩ doz	8 50	9 00	9 50
Lathing, " 1 2 3.....	₩ doz	7 50	8 00	9 50

.....dis 15 %

Hunt's				
Shingling, Nos. 1 2 3.....	₩ doz	$7 25	8 00	8 75
Claw, " 1 2 3.....	₩ doz	7 75	8 50	9 25
Lathing, " 1 2 3.....	₩ doz	7 50	8 25	9 00

.....dis 25 %

Hurd's				
Shingling, Nos. 1 2 3.....	₩ doz	$8 00	8 50	9 00
Claw, " 1 2 3.....	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3.....	₩ doz	8 00	8 50	9 00

Newark's Edge Tool Co.'s				dis 25 %
Shingling, Nos. 1 2 3.....	₩ doz	$6 50	7 00	7 50
Claw, " 1 2 3.....	₩ doz	7 25	7 75	8 25
Lathing, " 1 2 3.....	₩ doz	6 50	7 00	7 50

.....dis 12½ %

Yerkes & Plumb				
Shingling, Nos. 1 2 3.....	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3.....	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3.....	₩ doz	7 00	7 50	8 00

.....dis 15 %

Simmon's					
Shingling, Nos. 0 1 2 3...	₩ doz	$7 50	8 00	8 50	9 00
Claw, " 1 2 3...	₩ doz		9 00	9 50	10 00
Lathing, " 1 2 3...	₩ doz		8 00	8 50	9 00
Broad, " 1 2 3...	₩ doz		9 00	10 00	12 00
" " 4 5 6...	₩ doz		14 00	16 00	18 00
" " 7 8...	₩ doz		20 00	22 00	

.....dis 25 %

Elephant				
Shingling, Nos. 1 2 3.....	₩ doz	$6 00	8 50	9 00
Claw, " 1 2 3.....	₩ doz	9 00	9 50	10 00
Lathing, " 1 2 3.....	₩ doz	8 00	8 50	9 00

.....dis 5 %

J. P. Verree & Co.				
Shingling, Nos. 1 2 3.....	₩ doz	$7 00	7 50	8 00
Claw, " 1 2 3.....	₩ doz	7 50	8 00	8 50
Lathing, " 1 2 3.....	₩ doz	7 00	7 50	8 00

.....dis 10 %

Underhill's				
Shingling, Nos. 1 2 3.....	₩ doz	7 25	8 00	8 75
Claw, " 1 2 3.....	₩ doz	7 75	8 50	9 25
Lathing, " 1 2 3.....	₩ doz	12 00	11 00	13 00

Hinges.
Gate, Western.....₩ doz $6 25—dis 60&10 %
" N. E.....₩ doz 11 25—dis 6 &10&10 %
" N. Y. State.....₩ doz 7 20—d.s 60&10 %
Rolled Plate.....dis 65&10 %
" Raised.....dis 65&10 %
Wrought Strap and T.....dis 25&10 %
Providence Plate.....{ 6 and 8 in. 11c ₩ ℔ } dis 25 @ 30 %
{ over 8 in. 9½c ₩ ℔ }
Screw Hook and Strap.....{ ⅝ to 10, 12 in. 7c } net
{ 14 to 36 in. 6c }
Heavy Welded Hook.....{ 8 to 12 in., 6½c } net
{ 14 in & up, 6c }
Screw Hook and Eye.....{ ⅜ to 1 in., 6½c } net
{ ⅜ in. 7½c }
{ ⅛ in. 9c }

Hoes.
Solid Shank, C. S.....₩ doz $8 00—dis 30 %
Socket.....₩ doz 9 00—dis 30 %
Riveted Eye.....₩ doz 5 00—dis 30 %
Grub.....dis 25 %
Planters'—Winsted.....add 10 %
Scovill.....add 33⅓ %
Scovill Pattern (Winsted).....add 20 %
Lane's C. S. Crescent, American Pattern.....add 5 %
" " " Scovil Pattern.....add 15 %

Hooks.
Harness.....dis 60 10&5 %
Bird Cage.....dis 20&10 %
Cotton.....dis 50 %
Belt.....dis 50&10 %
Clothes Line.....dis 60&10&10 %
Bench—Skinner's.....per doz $8 00, dis 30&10 %
Bench—Hotchkiss' $5 00 ₩ doz.....dis 10 %
Bench—Weston's No. 1, $8 00; No. 2, $7 00 per doz net
" —McGill's.....$3 00 per doz, dis 10 %
Wardrobe, Japanned.....new list dis 60, 10&5 %
Hat and Coat.....new list dis 63, 10&5 %
Wrought Staples and Hooks and Staples.....dis 30&10 %
Screw Hooks and Eyes.....dis 70, 10&10 %
Grass.....dis 2 %
Whiffletree—Patent.....dis 30 %
Hooks and Eyes—Malleable Iron.....dis 60&10&10 %
" " Brass.....dis 60&10&10 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Aussable Horse Nail Co.

No.	5	6	7	8	9	10
Aussable	30c	27c	25c	24c	23c	22c
Pointed and Polished	31c	28c	26c	25c	24c	23c
Pointed and Blued	32c	29c	27c	26c	25c	24c

In lots of 1000 lbs., 5% discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	32c	30c	29c	30c	30c	30c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9
	31c	28c	26c	25c	24c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished).

No.	5	6	7	8	9	10
Patent Finish	23	25	23	22	21	20
Extra "	30	27	25	24	23	22

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 1½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
	27c	25c	24c	23c	22c
U B	28c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₩ ℔ 16c
Morgan.....14c

Horse Shoes.
Burden.....₩ keg, $5 85
R. I. Horse Shoe Co., Perkins Pattern.....₩ keg, 5 85
" " " R. I. Pattern.....₩ keg, 6 25
Mule Shoes.....₩ keg, 6 85

Kettles.
Brass.....₩ ℔ 55c net
In lots of 500 lbs.....₩ ℔ 50c net

Knives.
Ames' Butcher Knives.....dis 20 %
" Shoe " .....dis 15 %
" Bread " .....₩ doz $1 50—dis 15 %
Hay and Straw, "Wadsworth's".....dis 30 %
Lothrop's Cocoa Handle Lap Bolster Butcher Knives.....dis 25 %

Knobs.
Carriage.....dis 60&10 %
Base—Common.....net
" Flush Tip.....dis 10 %
" Elastic End, No. 8.....dis 30&10 %

Ladles.
Melting.....dis 20 %

Lanterns.
Peerless.....No. 8, per doz $11 75—dis 10&10 %
Brady's Patent.....dis 10 & 10 %
Etna.....dis 10 & 10 %
Yankee.....dis 10 & 10 %
De Beque.....dis 10 & 10 %

Lard Presses.
Draw Cut, 14 inch.....each $65 00—dis 20 %

Lemon Squeezers.
Porcelain Lined.....per doz $7 00, dis 10 %

Lines.
Linen Fish.....dis 10&10 %
Cotton Chalk.....dis 40 %
Silver Lake Chalk.....dis 10&10 %
Mason's.....dis 10&10 %
Galvanized Wire Clothes.....$1 per 100 ft. dis 33⅓ %
" Eagle.....dis 2 %
Trunk " .....new list dis 25 %
Langstroth & Crane, Round Key.....dis 40 %
" " Flat Key.....dis 33⅓ %
Barnes & Deitz.....dis 25 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Romer's Padlocks.....dis 15 %
Scandinavian Jail.....dis 10 %
American Lock Co.....dis 33⅓ %
Plate.....dis 25 %
Pad.....dis 50&5, and 2 % for cash
Yale Lock Co.....dis 40 %
Sargent & Greenleaf.....dis 20 %
Trenton.....
Branford.....
Norwich.....
Russell & Erwin.....dis 45&5 %
Norwalk.....2 % extra for cash.
Nashua.....
Mallory, Wheeler & Co.....
P. & F. Corbin.....
Parker & Whipple.....
Jacobus & Nimick Mfg. Co.....

Mallets.
Hickory and Lignumvitæ.....dis 20 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 10 %

No.	1	2	3	4
₩ doz.	$14 00	$17 00	$19 00	$20 00

Hales'.....dis 25 %

No.	11	12	13
₩ doz.	$37 00	$33 00	$42 00

Miles Challenge.....dis 20 %

No.	1	2	3
₩ doz.	$32 00	$36 00	$40 00

Perry's Champion (P. S. & W.).....dis 10 %

No.	200	300	400
₩ doz.	$32 00	$37 00	$40 00

Woodruff's (P. S. & W.).....dis 10 %

No.	100	150
₩ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

No.	5	3	2½	2	1	0
Each	$6 00	$9 00	$12 00	$15 00	$30 00	$48 00

Draw Cut.....dis 20 %

No.	5	6	8
Each	$56 00	$90 00	$250 00

Molasses Gates.
Stebbins'.....dis 65&10 %
" Tinned ends.....dis 40&10 %
Bush's.....dis 20 %
Lincoln's.....dis 50 %
Weed's.....dis 15 %

Mortars and Pestles.
Iron.....net

Nails......See Trade Report

Nail Pullers.
Capewell's Giant.....per doz $30 00 net

Nuts and Washers.
Nuts.....large, 6c; small, 8c off list.
Washers.....large, 8c; small, 10c off list.

Oil Stones.
Washita No. 1.....₩ ℔ 23c
Washita Slips.....₩ ℔ 45c
Washita No. 2.....₩ ℔ 17c
Arkansas.....₩ ℔ 1 25—dis 12½ %
" Slips.....₩ ℔ $2 00—dis 12½ %
Hindostan.....₩ ℔ 6c dis 20&10 %
" Slips.....₩ ℔ 10c dis 10&10 %
Hand Stone.....6c—dis 10&10 %

Oilers.
Miller's Zinc.....dis 40 %
" Brass and Copper.....dis 30 %
Sheet Metal Screw, Zinc.....dis 37½ %
" " Brass.....dis 33⅓ %
Olmsted's.....new list dis 25&10 %
Broughton's.....dis 25&5 %
Malleable.....per doz $5

Trenton Parallel.....dis 15 %
Merrill's Parallel.....dis 15 %
Parker's.....dis 20 %
Stephens' Parallel.....dis 15 & 20 %
Bonney's Saw Filers.....per doz $20—dis 25 %
Stearn's Saw Filers.....per doz $30—dis 25 %

Wheel Barrows.

Canal (Pugsley & Chapman).....new list dis 10 %
Coal, Garden and Stone (Pugsley & Chapman)....dis 25 %

Wheel Heads.

Brass Bushed.....per doz $3 50 net

Well Wheels.

Revised list.....dis 60&10 %

Wire.

Brass and Copper.....dis 10 %
Bright and Annealed.....Nos. 0 @ 18 dis 40 @ 45 %
" " " " 19 @ 26 dis 50 @ 55 %
" " " " 27 @ 36 dis 55 @ 60 %
Coppered.....0 @ 18 dis 35 @ 40 %
Galvanized. Nos. 0 to 6.....market list net @ dis 5 %
Galvanized, Nos. 7 to 18.....market list dis 10 @ 15 %
Tinned.....dis 25 @ 30 %
Cast Steel.....15 @ 20 %
Tinned Broom Wire.....dis 80 @ 85 %
Galvanized Telegraph, Nos. 8 and 9.....₩ ℔ 9c @ 10c
Galvanized Telegraph. Nos. 10 and 11...₩ ℔ 10½c @ 11½c
" " 12.....₩ ℔ 10½c @ 11½c
Annealed Fence. Nos. 6 and 9.....dis 40 @ 45 %
" Grape, " 10 to 14.....dis 40 @ 45 %
Fence Staples.....₩ ℔ 8 @ 8½ %
Stubs' Steel Wire.....$7 00 to £ gold
Judd's Picture Wire.....dis 30 %

Wrenches.

American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 30 %
" Diagonal.....dis 20 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&5 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 60&10 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 70 %
Davis' Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 20&5 %

Wringers.

Providence.....₩ doz $67 00
Reliance.....₩ doz 57 00
Universal—Extra.....₩ doz 60 00
Noveity.....₩ doz 60 00
Sherman.....₩ doz 57 00
Monitor.....₩ doz 57 00
King.....₩ doz 60 00
Crown.....₩ doz 60 00
Eureka.....₩ doz 60 00
Independent.....₩ doz 57 00

TIN WARE AND TRIMMINGS.

STAMPED TIN WARE, dis 10 %.

COMMON STAMPED WARE, &C.

Bucket Covers.

Quarts	½	1	2	3	4
Inch	4½	5 8-16	6 5-16	6¾	7 11-16
Per gross	$2 00	2 60	3 40	4 25	5 75
Quarts		6	8	10	12
Inch		8¾	9½	9¾	10 9-16
Per gross		$7 00	8 00	8 50	11 50

Cake Box Covers.

	Small.	Medium.	Large.
Inch	11¼	12¼	13¼
Per gross	$15 00	18 00	22 00

Pot Covers.

Inch	7¾	8¼	8¾	9¼	9¾	10¼
Per gross	$5 75	6 00	6 25	6 75	7 25	8 25
Inch	10¾	11¼	11¾	12¼	12¾	13¼
Per gross	$8 25	9 50	10 00	13 00	13 75	16 50

Pie, Dinner or Scolloped Plates.

Inch	6	7	8	9	10	11
Per gross	$4 00	5 50	6 00	6 50	8 50	10 50

Deep Pie Plates.

Inch				9		10
Per gross				$8 50		10 50

Jelly Cake Pans.

Inch				9		10
Per gross				$7 50		10 00

Coffee Pot Covers.

Plain	1½	2	3	4	5	6 qts.
Inch	3	3¾	3¾	4½	5	
Per gross	$1 15	1 40	1 60	2 00	2 75	3 00
Rimmed	2¾	3	3½	4	4½ inches.	
Per gross	$2 25	2 50	3 00	3 50	4 00	

T. K. Breasts only.

Inch	7¼	8	8¾	9	9¾	10	10½	11	11½
Per gross	$6 00	6 50	6 75	7 25	7 75	9 50	10 00	12 00	13 00

Grater Plates.

Sheet			¼		½		1
Per gross			$3 00		6 00		11 50

Scolloped Cake Pans.

	Small.	Large.
Without Tubes.....per gross,	$8 00	11 50
With Tubes.....per gross,	10 50	14 00

Stamped Square Pans.

No.				½
Per gross				$7 50

Common Square Pans (One Sheet).

Per gross	$12 50

Milk Skimmers (Plain or Pierced).

Per gross	$4 00

Lettered Plates.

Inch	5½	6
Per gross	$3 25	4 00

Steamer Bottoms.

Add $1 per gross, or 10c. per doz. to list of Pot Covers.

Tin Stove Pipe Rings.

Inch	4	4½	5	5½	6	7
Plain.....per gro.	$4 50	5 00	5 50	6 00	6 50	7 50
Jap'd or Burn'd.. "	6 00	6 50	7 00	8 00	9 50	10 00

Coffee Boiler Lips.

	Small.	Large.
To Rivet.....per gross,	$0 80	1 10
To Solder....."	1 25	

Plain Stamped Water Dippers,

	½ pint.	Pint.	Quart.	2 quarts.	2½ quarts.
Per doz	90	1 15	1 50	1 85	2 50

RETINNED WARE, dis 25 %.

Retinned Milk Pans.

Qts	½	1	1½	2	3	3½	4	5	6	8	10	12
₩ doz	1 20	1 50	1 75	2 00	2 25	2 75	3 15	3 50	3 85	4 15	5 25	5 75

Dipper Bowls, Plain Stamped.....dis 20 @ 25 %

Pints	½	1	Quarts	1	2	2½
Per doz	50	75	Per doz	1 00	1 25	1 75

Dipper Bowls, Retinned.....dis 20 @ 25 %

Pints	½	1	Quarts	1	2	2½
Per doz	75	90	1 05	Per doz	1 40	1 75	2 25

Pans.

Dish Pans, Tinned.....dis 20 @ 25 %

Quarts	7	8	10	14	17	21	30
Per doz	8 50	9 50	11 00	13 00	16 00	19 00	30 00

JAPANNED TIN WARE.

Canisters, Common.....dis 10 %

Pound	½	1	2	3
Per doz	$1 10	1 60	2 50	3 25

Canisters, Hinged......dis 10 %

Pound	1	2
Per doz	$1 75	2 75	3 40	3 75	4 50

Candlesticks, Japanned......dis 10 %

No					1	2
Per gross					$3 00	7 00

Cake Boxes.....Round.....per nest, $3 25, dis 10 %
" Square.....per nest, 4 25, dis 10 %

Chamber Pails, Japanned (Smith, Burns & Co.)....dis 10 %

Nos	2	3	4	5
Green, per doz	$8 00	9 00	10 50	12 50
Oak "	9 50	10 50	12 00	13 50

Dust Pans, Corrugated.....per gross, $22 00, dis 10 %
Box Graters.....per gross, $4 00, dis 10 %
Molasses Cups.....dis 10 %

Pint	½	1	2
Per doz	$1 25	50	2 75

Lunch Boxes, per doz.....7 in $2 00; 8 in. $2 50; dis 10 %
Pepper Boxes Japanned.....dis 10 %
Per gross.....Small, $3 00; Large, $4 00
Toy Banks, House.....dis 10 %
Tea Trays, American Tea Tray Co.....dis 15 %

No	1	2
Per gross	$7 00	5 50

Toy Banks Gothic.....dis 10 %

No						1
Per gross						$5 50

Toy Cups, Straight.....dis 10 %

No			1	2	3
Per gross			$4 00	2 50	2 00

Toy Cups, Flaring...No. 1, $4 25; 2, $3 70 ₩ gross, dis 10 %
Toy Pails, Covered.....dis 10 %

No							1
Per gross							$4 50

Toy Rattles.....per gross, $2 25, dis 10 %
Trunks. Wire Handled.....per nest (5) $1 50, dis 10 %
Spittoons, Tin....per gross. No. 2, $30. No. 3, $47, dis 10 %

PLANISHED TIN WARE.

Planished Coffee Pots, Round......dis 25 @ 30 %

Each	80	75	85	95	1 15	1 25	1 30	1 40
Pints	1	2	3	4	5	6	7	8

Planished Tea Pots, Round......dis 25 @ 30 %

Each			70	80	95	1 05	1 25
			1	2	3	4	5	6

Planished Tea Pots, Oval......dis 25 @ 30 %

Each	70	80	90	1 05	1 15	1 40	1 75
Pints	1	2	3	4	5	6	8

Planished Pepper Boxes, No. 1......per doz., $1 52
Planished Flour Dredges, No. 8, 12 10; 4, 7 50 ₩ dozen.
Planished Round Coffee Biggins.....dis 25 %

Pints	2	3	4	5	6	8
Each	$1 00	1 10	1 20	1 40	1 60	2 00

Planished Oval Coffee Biggins......dis 25 %

Pints	2	3	4	5	6	8
Each	$1 15	1 25	1 40	1 60	1 80	2 25

Planished Oval Chafing Dishes, Imperial Covers...dis 25 %

Inch	10	12	14	16	18	20	22	24
Each	$3 85	5 00	6 25	7 60	9 00	11 50	15 00	16 50

Planished Oval Chafing Dishes, Low Covers......dis 25 %

Inch	10	12	14	16	18	20
Each	$3 25	4 25	5 20	6 20	7 30	9 25

Planished Low Dish Covers......dis 25 %

Inch	10	11	13	14	16	18	20
Each	1 70	1 80	1 90	2 00	2 40	2 60	2 75

Planished Imperial Dish Covers......dis 25 %

Inch	10	11	12	14	16	18	20	22	24
Each	$1 25	1 70	2 00	2 60	3 15	3 45	4 60	5 45	6 30

Planished Etnas, on Stands......dis 25 %

Pints	1½	3	3	4	5
Each	$0 90	1 00	1 20	1 50	1 75

Planished Liquor Mixers......dis 25 %

Nos			0	1	2
Per doz			$2 00	2 10	2 45

Planished Oval Melon Molds......dis 25 %

Nos	2	3	4	5	6	7	8	9
Each	60	65	70	80	90	1 00	1 15	1 25

Planished Oval Tumbler Warmers......dis 25 %

To fit 1, 2, 3, and 4 O. G. Urns.....each, $2 50

Planished Oval O. G. Urns......dis 25%

Nos	0	1	2	3	4	5	6	7	8
Each	$4 20	5 45	6 30	7 00	7 75	9 25	11 25	13 50	15 50

Planished Round Urns......dis 25 %

Nos	0	1	2	3	4	5	6	7
Each	4 20	4 85	5 45	6 30	7 25	9 00	11 00	14 25

Planished Round Oyster Dishes, (Complete)......dis 25 %

Nos							1	2
Each							$2 10	2 80

Planished Oyster Dish Plates......dis 25 %

Nos			1	2
Each			$0 25	0 30

Oyster Dish Covers......dis 25 %

Nos			1	2
Each			$0 30	0 35

Tea Pot Handles—P. S. & W.....dis 20 %
Stow's Patent Hollow Tea Pot Handles.

No. 1, Small	4½ inches	per gross,	$11 50
No. 2, Medium,	5¾ "	"	12 50
No. 3, Large,	6½ "	"	13 50

No. 4, Ex. Large 7¼ in., for Wash Pitchers &c.....per gross, 18 00

Stow's Patent. New Pattern.

No. 25, Small,	4½ inches	per gross,	$11 50
No. 35, Medium,	5¾ "	"	12 00
No. 45, Large,	6½ "	"	13 00

Solid Iron. Tin Tipped.

No. 10, Small,	4¾ inches	per gross,	$9 00
No. 15, Medium,	5½ "	"	9 50
No. 20, Large,	6½ "	"	10 75

Stow's Patent Hollow Tea Pot Handles, Adamantine Bronze—P. S. & W.

No. 12. Bronzed and Tin-Tipped.....per gross, $13 50

Saucepan Handles, Of Best Malleable Iron.
P. S. & W.....dis 20 %

Japanned.

No. 1, 5½ inches long		per gross,	$2 50
No. 2, 6	"	"	3 75
No. 3, 6½	"	"	4 00
No. 4, 7¼	"	"	4 25
No. 5, 8	"	"	4 50
No. 6, 9	"	"	4 75

Tinned.

No. 1, 5½ inches long		per gross,	$4 25
No. 2, 6	"	"	4 50
No. 3, 6½	"	"	4 75
No. 4, 7¼	"	"	5 25
No. 5, 8	"	"	5 50
No. 6, 9	"	"	5 75

Japanned.....per lb., 16
Tinned....." 20

Iron Kettle Ears (P., S. & W.).....dis 45 %
Half gross pairs in a package.

Tinned.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	88c	$1 00	1 50	1 75	2 10	2 75	3 50	4 75

Black.

Nos	1	2	3	4	5	6	7	8
Per gross pairs	75c	88c	$1 35	1 50	1 75	2 25	2 75	4 00

Tinned Tea Kettle.

Nos				4	5	6
Per gross pairs				$1 75	2 10	2 75

Extra Heavy Tinned Kettle Ears—French Pattern.

Nos	1	2	3	4	5	6	7
Per gross pairs	$1 00	1 25	1 50	1 75	2 25	2 75	3 50

Malleable Iron Kettle Ears for Coal Hods, &c.
P., S. & W.....dis 20 %

No. 10 Small	₩ ℔, Tinned,	30c;	Black,	16c
No. 20 Medium	₩ ℔, "	20c;	"	16c
No. 30 Large	₩ ℔, "	20c;	"	16c
No. 40 Extra Large	₩ ℔, "	20c;	"	16c

In cases of 100 lbs. each.

Milk Urn or Boiler Handles—(P. S. & W.) 4¼ in...dis 25
Plain, 8c.; Japn'd, 9c.; Tinned, 16c. per lb.; Malleable Clips or Ears to match, Tinned.....30c per lb.

Toilet Ware Handles—4½ inches (P. S. & W.).....dis 35 %
Plain with drilled holes, per lb.....9c
Plain with Cast " " 8c

Plumbers' Scrapers—(P. S. & W).....dis 25 %
Extra quality, length 6 in., per doz.....$1 00

METALS.

IRON.—DUTY Bars, 1 to 1¼ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 2 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 75 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.

Foundry No. 1	₩ ton,	$25 00 @ 26 00
Foundry No. 2	"	23 00 @ 24 00
Gray Forge	"	21 00 @ 22 00
White and Mottled	"	

SCOTCH.

Coltness	"	40 00 @ 41 00
Glengarnock	"	37 00 @
Eglinton	"	35 00 @
Summerlee	"	none

Bar Iron.
Am. Refined, at mill.....nominal.....

Rails.

Welsh, gold	₩ ton,	47 00 @ 50 00
American, at works, currency	"	48 00 @ 50 00
Old Rails, currency	"	28 50 @ 30 00

Scrap.

Wrought Scrap	"	28 00 @ 30 00

Bar Iron from Store.

Common Iron.		
¼ to 2 in. round and square	₩ ton,	$62 50
⅝x9-16 in " "	"	67 50
½ in. " "	"	70 00
2½ to 2 in. "	"	67 50
1 to 6 in. wide x ⅜ and 1 in thick	"	62 50
1¼ to 6 in wide x ¼ & 5-16 in. thick	"	65 00
1 and 1¼ in. x ¼ and 5-16	"	75 00
Swedish Iron		
1¼x⅜ to ⅞	"	135 00
1¼ to 5x¼ to ⅜ and ⅜ to 1¼ in. square	"	130 00
6 to 7x¾ and ½	"	140 00
Rennea Iron.		
¼ to 2 in. round and square	"	65 00
1 to 6 in. wide x ⅜ to 1 thick	"	65 00
1¼ to 6 in. wide x ¼ and 5-16 thick	"	70 00
1 and 1¼ x ¼ and 5-16	"	70 00
Large Rounds.		
2¼ to 2½ round and square	"	75 00
3, 3¼ and 3½ in.	"	80 00
3¾ and 4 in.	"	87 50
Rods—⅜ and 11-16, round and square	"	67 50
½ and 9-16, " "	"	70 00
7-16, " "	"	77 50
⅝, " "	"	82 50
5-16, " "	"	87 50
¾, " "	"	92 50
3-16, " "	"	110 00

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	₩ ℔ 4¼	5¼c	5¼c
" 21 to 24	" 4¼ @ 4¾c	5¾c	5¾c
" 25 to 26	" 4¾c	5¾c	5¾c
" 27	" 5c	5¾c	6c
" 28	" 5½c	5¾c	6½c

Galvanized, 1 to 20, prime, ₩ ℔ 10; 2d quality...₩ ℔ 9c

"	21 to 24	"	"	11	"	"	10c
"	25 to 26	"	"	12	"	"	11c
"	27	"	"	13	"	"	12c
"	28	"	"	14	"	"	13c

Patent Polished.....₩ ℔ 15c
Russia, Nos. 8 to 28....." 17c
" Stained, No. 1....." 16c
Belgian....." 13c

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON

¼	½	¾	1	1¼	1½	2	7 inch.
$7 50	3 50	4 50	5 25	6 50	per doz.		

RUSSIA IRON.

4½	5	5½	6	7 inch.
$5 00	7 00	9 50	12 00	14 00 per doz.

BABBITT METAL.

N. P. U.....₩ ℔ 8½ @ 9c

COPPER—DUTY: Pig, bar and ingot, 5c.; old copper, 4 cents ₩ ℔; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot.....₩ ℔ 23½ @ 24c
English.....

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....35c. ₩ ℔
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....35c. "
Braziers' Copper, 12 oz. per square foot and lighter.35c. "
Circles less than 24 inch in diameter.....35c ₩ ℔
Circles, 24 inch diameter and over.....39c. "
Segment and Pattern Sheets.....35c. "
Locomotive Fire Box Sheets.....32c. "
Sheathing Copper, over 12 oz. per sq. ft.....31c. "
" " 12 oz. ₩ sq. ft. and lighter...33c. "
Bolt Copper.....33c. "
Copper Bottoms.32 c. ₩ ℔.....net
No Copper in Sheathing except 14x48 inches, and not to exceed 24 oz. to the square foot.

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier.....35c. By the case, 32c. ₩ ℔
12 oz. and lighter.....39c. " " 38c. "

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60

14 and 16 oz. and heavier.....35c. By the case, 37c. ₩ ℔
(And all sizes not over 20 inches wide.)

30x60

14 and 16 oz. and heavier.....40c. ₩ ℔
12 oz.....43c. "

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Boiler Sizes, 7 and 8 inch.....12c. "
" 9 inch.....15c. "
Other sizes not larger than 20x60.....2½c. ₩ sq.
Larger than 20x60.....5c. "

LEAD—DUTY Pig $1 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.

Spanish			6¼ @ 7c	gold
German Refined			6¼ @ 6¾c	gold
English			6¼ @ 7c	gold
American			6¾ to 6¾c	gold
Bar		dis 10 %		8½c.
Pipe		dis 10 %		8½c.
Tin Lined Pipe		dis 10 %		16½c.
Sheet		dis 10 %		8½c.
Shot		dis 10 %	Drop, 8½c.; Buck.	9½c.

SOLDER.....No. 1, 15c; No. 2, 13½ @ 14c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 3½ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	12 @ 14c
" circular as to dize	14 @ 30c

Chrome Steel.

Tool	₩ ℔ 20 @ 21c
Tool, extra fine	" 40 @ 75c
Spring	₩ ℔ 12c and upward
Machinery	₩ ℔ 14c.
Hammer	" 15c,
Gun or Homogeneous	" 16c

English Steel,—payable in gold, dis 5 % cash.

Best Cast	₩ ℔ 18c
Extra Cast	" 19c
Round Machinery, Cast	" 11½c
Swaged, Cast	" 18c
Best Double Shear	" 18c
Blister, 1st quality	" 13½c
" 2d quality	" 11½c
" 3d quality	" 10½c
German Steel, Best	" 11½c
do 2d quality	" 10½c
Sheet Cast Steel, 1st quality	" 18c
" " 2d quality	" 16c
" " 3d quality	" 14c
File Steel, Flat and ½ Round	" 12½c
" Square and Round	" 13c
" Mill	" 13½c
" Taper to 4 inch	" 17c
" Taper 3 and 3½ inch	" 18c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash	6¼ @ 7c., gold
American "	6¼ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per ℔; Manufactures of, not enumerated, 35 per cent. ad val.—all subject to a reduction of 10 per cent. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₩ ℔ 26½ @ 27c., gold
Straits	₩ ℔ 22½ @ 22¾c., gold
English	₩ ℔ 22 @ 24½c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal	11 00
12x12, "	11 50
14x20, "	11 75
I X 10x14, "	13 25
12x12, "	13 75
14x20, "	14 25
D C 12½x17 "	10 50
D X 12½x17 "	12 75
For each additional X add	2 25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$10 25 @ 10 75	9 50 @ 10 00	9 00 @ 9 50
I C 12x12	10 75	10 50	
I C 14x20	11 25	10 50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$10 00	9 25 @ 9 75	7 75 @ 8 50
I X 14x20	12 25		
I C 20x28	20 00 @ 21 00	19 00 @ 19 75	16 50 @ 18 00
I X 20x28	26 00		
I C 20x200 ft.	24 00		

ZINC—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2½c. ₩ ℔. All subject to a reduction of 10 per cent.

Sheet	cask 9¾c
"	open 10c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6¼ @
" cotton. No. 1	6¾ @ 7
" " No. 2	@ 6
White linen rags. No. 1	6 @ 6½
" " No. 2	4¾ @
Colored	2¾ @
Mixed woolens	@ 2½
Soft woolens	@ 5½
Gunny bagging	1¾ @ 2
Jute Butts	2¼ @ 2¾
Kentucky bagging	5¾ @ 5¾
Book stock	1 @ 4¾
Waste paper and scraps	1 @ 1¾
Rope cuttings	1¾ @ 3
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5¾ @ 5¾
" No. 2	@ 4
Grass rope	3 @ 3½
Tarred Shaking	1½ @
White Colar Cuttings, all paper	@
" " muslin lined	5 @
" Envelope "	7 @
Hard White Shavings, No. 1	6¾ @
Soft " " No. 1	6 @
White Shavings, No. 2	5¾ @ 6
Mixed Shavings, part white	4 @ 4¾
Imperfections, No. 2, best folded sheets	5 @
" " 1, Heavy Stock	4¾ @
Book Stock, Mixed	3¾ @
" " No. 2, light	2 @ ¾
Prints	1¾ @ 2
Pure Manilas	2
Bogus Manilas and Hardwares	1 @ 1¾
Commons	1 @
Binders' Board Cuttings	1¾ @ 2
Straw Board Cuttings	1¾ @ 1¾

Old Metal.

Copper	@ 20
Yellow metal	14 @ 15
Brass	13 @ 14
Heavy Composition	17 @ 18
Old lead, solid	6 @ 6¼
Tea lead	4½
Wrought iron	1¾ @ 1¾
Sheet iron	0¾ @
Cast iron	1 @ 1¼
Machinery iron	1¾ @
Zinc	
Pewter, No. 1	17
" No. 2	10 @ 12
Spelter	5¼ @ 6

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₩ ℔ 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	20c
Black Paint, in oil.....kegs, 8c.; asst'd cans, 11 c	
Blue, Prussian, fair to best	50 @ 75c
" " in oil	35 @ 65c
" Chinese, dry	30c
" Ultramarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	3c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	" 30c " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Iced Lead, American	9¼c
" " English	10¼c
" Venetian (N. C.) dry	3½c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Turut	11½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	
" English	1 90
" Trieste	1 05
" American, Common	33c
" " pure dry	10c
" " in oil	11c
White Lead, American, pure dry	10c
" " in oil	11c
White, Paris, English, prime	in bbls. 3½ @ 4c
Yellow Ochre, French	2½ @ 3½c
" " " in oil	asst'd cans, 11c; kegs, 8½c
" " Vermont	in casks 1½c
" Chrome	17 @ 21c
" " in oil	18 @ 23c
Zinc White, American No. 1 dry	9c
" " " in oil	11c
" French (Paris)	11 c
" " in oil	12 c

Oils.

Linseed Raw	₩ gal. casks, 79c.	bbls. 80c
" Boiled	" 81c.	" 82c
Whale, Crude		
" Bleached Winter		
Sperm, Crude		1 45
" Winter unbleached		1 85
" " bleached		1 90
Seal, Extra Refined		
Lard, Pure Winter		
" Spring		1 00
Cotton Seed, Crude		60c
" Southern Yellow		65c
" White		
Neatsfoot, Winter		70c @ $1 10
Natural Lubricating		38c @ 40c

Sundries.

Asphaltum	9c
Benzine	₩ gal. 16c
Chalk	1¼c
" Block	1½c
Dryer, Patent, Am'n	asst'd cans, 10½c.; kegs 9c
" " English	" 11c.; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 47c
" Sheet	30c
Glaziers' Points, Zinc	9c
Gum, Copal	30c
" Damar	20c
" Shellac, English	75c
" " dark	50c
Litsarge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	5½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	35c
Whiting, Spanish	1c

Grindstones, Emery, &c.

Walter R. Wood,
GRINDSTONES.

SOLE AGENT OF THE
BEREA STONE CO., of Ohio.
NOVA SCOTIA and other brands.
283 & 285 Front Street, New York.

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AMHERST,
INDEPENDENCE,
LAKE HURON,
AND BEREA.

Also Scythe Stones.
WORTHINGTON & SONS, Mfrs.,
North Amherst, Ohio.

EMERY WHEELS AND MACHINERY
Upon which to run the same, of all kinds.

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Manufacturers of
"LEHIGH" Emery Wheels and Machines.
Send for Circulars.

THE
Rocky Mountain Vermilion Paint

is "Nature's Compound" of Copper, Mercury, Lead and Iron. A pure Oxide of Metals, containing no earthy matter, hence we claim and are prepared to prove that it is the Best and Cheapest Paint in the market. Properly mixed, we will guarantee it to cover double the surface and wear twice as long as ordinary paints. It will not Peel, Scale, Crack or Blister, though subjected to high degrees of heat. It will effectually Prevent the Corrosion of Metals, even in mid ocean. Warranted superior to red lead or any other lead, for any and all purposes for which paint is required. Please send for circulars.
All orders should be addressed, **Wm. H. Corey,** General Agent, 27 Sabin St., Providence, R. I.

Bennett Hotchkiss and N. C. Stiles' Patent.

This Drop (which has been illustrated in this journal of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of BENNETT HOTCHKISS (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C. STILES. Our improvements consist:

First.—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place, to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.

Second.—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps situated under the rolls, so arranged that as the hammer ascends they will freely open of themselves, but on descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.

Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain *any hight* of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less hight than the collar is set for is required, work the hand lever, which will give you any hight of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired hight, so that the next blow can be given from a state of rest, of less hight than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less hight than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.

The clamps in holding up the hammer keep the boar from touching either roll and prevents the same from being worn uneven.

Manufactured only by the
Stiles & Parker Press Co.,
MIDDLETOWN, CONN.

L. COES'
Genuine Improved Patent
SCREW WRENCHES.

Manufactured by
L. COES & CO.,
Worcester, Mass.

Established [illegible] in 1839.
Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

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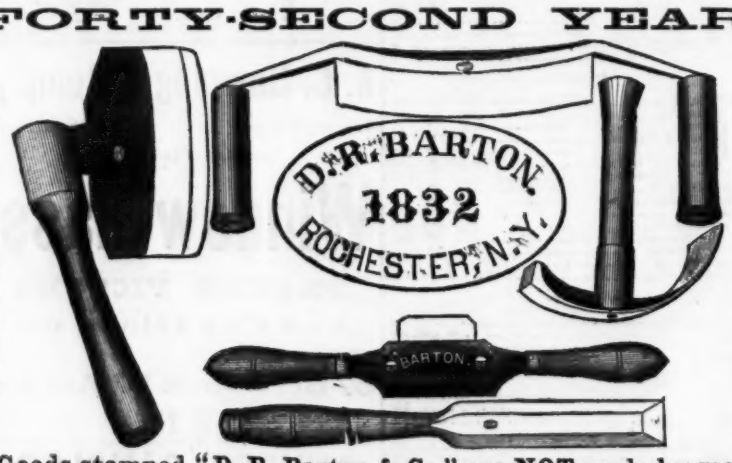

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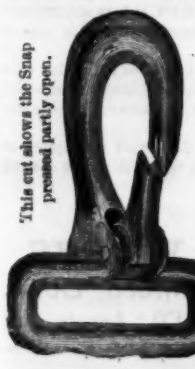

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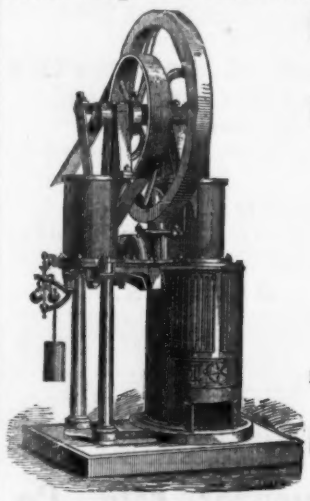

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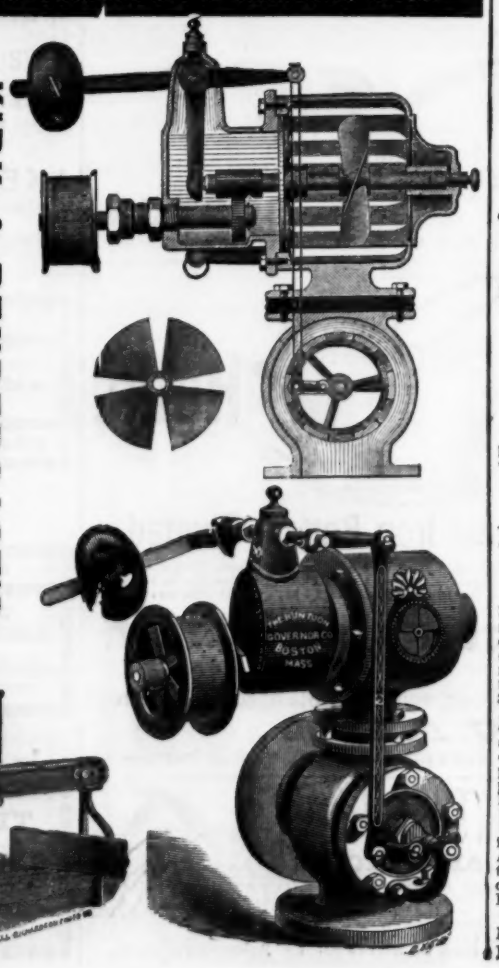

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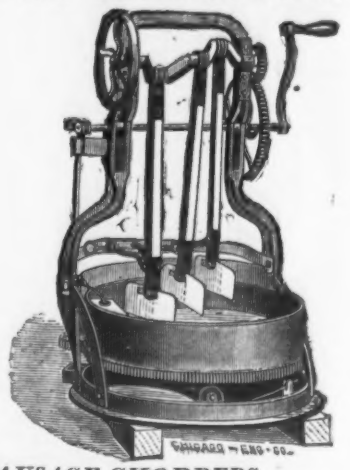

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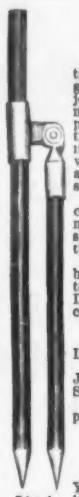

Fig. 1.

PENCIL DIVIDERS.

The following cuts represent a simple contrivance, for which Letters Patent were granted Feb. 24th, 1874. It consists of a metal joint by which two ordinary Lead Pencils may be connected together so as to form a pair of Dividers which may be used for all the purposes to which Dividers are applicable in ordinary Drawing, and which have the advantage of being lighter and cheaper than anything else in the market which will do the same work.

Fig. 1 shows it as applied to a pair of pencils, and Fig. 2 represents a steel point, connected with a spring socket, which may be slipped over the point of either of the pencils thus forming a pair of steel pointed dividers.

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Instrument with 2 Pencils and one steel point	$3·00	$33·00
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Fig. 2.

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No auxiliary valves used. Direct connection between piston rod and valve movement. No knocking or jarring. Circulars and price lists sent upon application.

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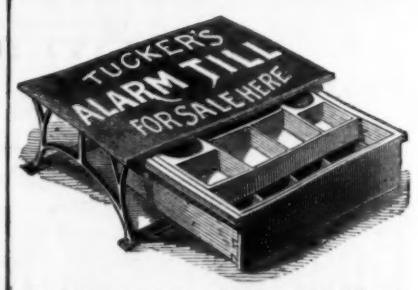

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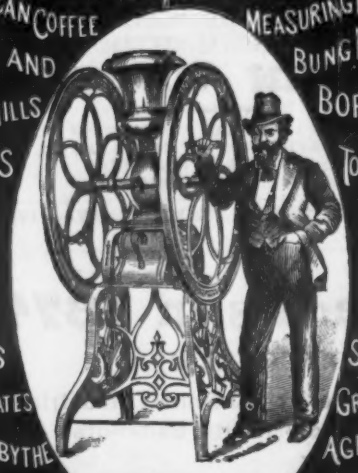

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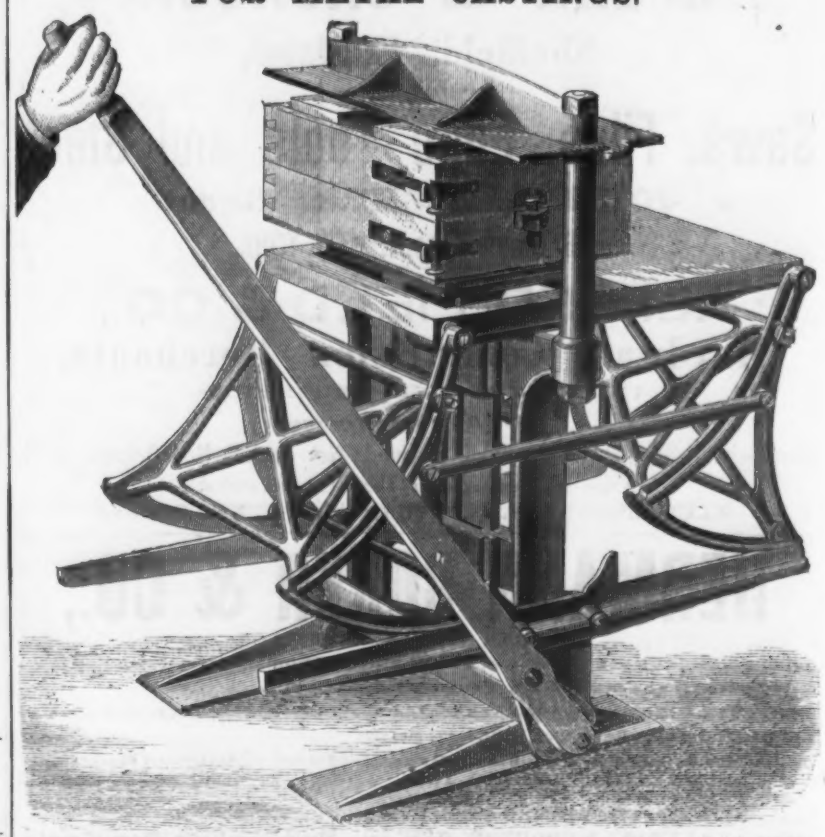

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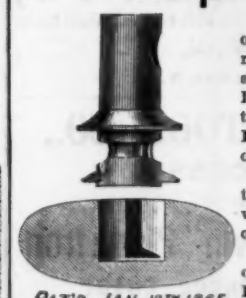

PAT'D, JAN 10TH 1865.

On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED** and **MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See *The Iron Age*, of August 21st., page 11, for illustrated description of our patent **Telescope Locks and Latches,** with patent Flat **Steel Perforated Keys,**

Address

BRANFORD LOCK WORKS,

Branford, Conn.

Or, THE HART, BLIVEN & MEAD MANUFACTURING CO., Agents,

18 & 20 Cliff and 243 & 245 Pearl Streets, New York

NEWCOMB BROS.

Manufacturers of

Smiths', Moulders' and Hand

BELLOWS.

For further particulars send for descriptive circular and price list.

586 Water St., near Montgomery N. Y

J. CLARK WILSON & CO., Agents, 81 Beekman Street, New York.

PHILADELPHIA.

(Corrected weekly by Lloyd, Supplee & Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.—Solid Cast Steel.....₩ lb 14c
Peter Wright's.....₩ lb, gold, 12½c
Wilkinson's.....11½c
Eagle.....11 cents currency—dis 15 @ 13&5 %
Apple Parers.—Union.....per doz $6 50 net
Skeleton..... " 6 50 net
Victor..... " 6 75 net
Domestic..... " 7·00 net
Reading..... " 7 00 net
Bay State Paring, Coring and Slicing.. " 12 00 net
" " Peach Parers..... " 10 50 net
Axes.—Mann's Light.....Per doz. $13 00 @ 12 50
Hunt's Light..... " 13 00 @ 12 50
Red Indian, all sizes..... " 12 50 @ 12 00
Red Chiefrain, all sizes..... " 13 00 @ 12 50
Crown Prince..... " 13 50 @ 13 00
Augers and Auger Bits.—Pierce's Pat.
Twist Bits.....dis 25 @ 30 %
Douglass' & Ives' Bits.....dis 30&10 %
Connecticut Valley Auger Bits.....dis 35&10 %
Cook's Bits.....dis 40&10 %
Jennings' Bits.....dis 10 %
Bates' Nut Augers.....dis 30&5 %
Douglass' & Ives' Augers.....dis 35&10 %
Watrous' Ship Augers.....dis 10 %
Bonney's Pat. Hollow Augers.....dis 25 %
Stearns' Patent Hollow Augers.....dis 25 %
Balances.—Landers, Frary & Clark's....dis 20 @ 27½ %
Chattillon's.....dis 20 @ 22½ %
Morton's.....dis 20 @22½ %
Common Spring with Hook..... ₩ doz $1 38 @ 3 00
Bells.—Bevin Bros. Mfg. Co. Light Hand Bells.....dis 60&10 %
Other makers light.....dis 65&10 %
Swiss Pattern Hand Bells.....dis 30 %
Connell's Door Bells.....dis 50 %
Great Western and Kentucky Cow.....dis 30&10 %
Boring Machines.—Bates' Mfg. Co., complete with augers.....dis 15 @ 20 %
Douglas Mfg. Co., complete with augers..dis 15 @ 20 %
Common Boring Machines, no Augers.....$4 25 @ 4 00
Angular " " ..... 5 25 @ 5 00
Bolts.—Eastern Carriage Bolts .....special prices
Western " " .....
Philadelphia " " .....dis 50&5 @ 50&10 %
" Eagle, (Coleman's).....dis 50&5 @ 50&10 %
Wrought Shutter.....dis 50 @ 50&5 %
Braces.—Barber's.....dis 40&5 %
Fackus.....dis50 %
Bartholomew's American Ball.....dis 10&10 %
Spofford.....dis 40 @ 40&5 %
Butts.—Cast Fast Joint, Narrow.....dis 30 %
" Broad.....dis 50 @ 50&5 %
Cast Fast Loose Joint.....dis 50 @ 50&5 %
" Acorn, Loose Pin.....
Wrought Loose Pin.....dis 35 %
" Table Hinges and Back Flaps.....dis 40 %
" Narrow.....dis 30 %
" Loose Joint.....dis 35 %
" Reversible.....dis 35 %
Parker's Blind Butts.... } Discount 50 % by the case
Shepard's " " } 50&10 %.
Clark's " " }
Cherrytree " }
Lull & Porter's Blind Butts.....dis 45&50 %
Chains.—German Halter.....dis 15 @ 20 %
" Coil.....dis 13 @ 20 %
Galvanized Pump.....₩ lb 15c
Best Proof Coil Chain—
₩ lb.... 13½ 10½ 9½ 9 8¾ 8½ 8c gold
3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ in.
By the cask, 560 lbs., discount ½c per lb. Common Chain, ½c per lb. less than proof.
Chisels.—Socket Framing.....dis 60 @ 60&10 %
Socket Firmer.....dis 60 @ 60&10 %
Tang " .....dis 40 @ 40&10 %
Beatty's Framing and Firmer.....dis 10 @ 15 %
Casters.—Porcelain Wheel.....dis 40&10 %
Iron and Brass Wheels.....dis 40 %
Iron Bed.....dis 40 %
Clothes Wringers.—Universal.....per doz $58 00
Novelty. " 58 00
Monitor. " 53 00
Discount in 3 dozen lots, $2 per dozen.
Coffee Mills.—Common Box and Side.....dis 10 @ 15 %
Patent Box and Side.....dis 10 @ 15 %
Cutlery.—American Pocket (best).....dis 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices
Drawing Knives.—Hart Mfg. Co.'s ..dis 60 @ 60&10 %
Concave Adjustable Handle.....dis 10 %
Beatty.....dis 10 @ 15 %
Fry Pans.
Tinned.....dis 20 %
₩ doz..$1·00 1·25 1·62 2·00 2·50 3·00 3·50 4·00 4·50
No..... 0 1 2 3 4 5 6 7 8
Burnished.....
₩ doz..$2·50 3·00 3·38 3·75 4·12 4·50 5·00 5·62 6·25
No..... 0 1 2 3 4 5 6 7 8
Files.
Nicholson Mill Files...new list, $5 00 to £ cur dis 12½ %
" Bastard..... " 5 00 to £ cur dis 12½ %
" Taper..... " 5 00 to £ cur dis 12½ %
Butcher's Mill.....$5 50 to £ gold
" Bastard..... 5 50 to £ gold
Taper..... 5 50 to £ gold
Fluting Machines.
K. F. M.—1¼ in. rolls, $5·50.....dis 10 %
" —6 in. rolls, $6·65.....dis 10 %
Mrs Knox—4 in. rolls, $5·50.....dis 10 %
" —6 in. rolls, $6·65.....dis 10 %
Hammers.
Yerkes & Plumb's.....dis 15 %
Hammond & Son's.....dis 15 %
Verce.....dis 15 %
Hatchets.
Beatty's.....dis 10 @ 15 %
Shingling and Half. { ₩ doz...$7·00 7·50 7·75 8·00
No..... 1 2 3
Yerkes & Plumb.....dis 15 %
Shingling and Half. { ₩ doz...$7·00 7·50 8·00 8·50
No..... 1 2 3 4
Claw.... { ₩ doz.....$7·50 8·00
No..... 1 2 3
Hinges.—Strap and T.....dis 40 %
Parker's Blind..... } Discount 50 %. By the case
Shepard's " } 50&10 %.
Clark's " for wood... }
Cherrytree Blind for wood. }
Lull & Porter's Blind.....dis 40&10 %
" .....by the case dis 5 %
Clark's Mortise Blind.....dis 40 %
Horse Nails. Nos. 6 7 8 9 10
Ausable..... 27 25 24 23 22
Globe..... 28 26 25 24 23
Brundage..... 26 24 23 22 21
Nos. 5 6 7 8 9 10
Putnam..... 32 28 26 25 24 23
On Ausable, Globe and Brundage 1000 ₩ lots.....dis 5 %
Knobs.—Door, Mortise and Rim.
Makes in Combination.....new list dis 45 %
Extra discount for cash 2 %
Mineral and Rim.....dis 5 %
Locks and Latches.—Rim and Mortise.....dis 45 %
Extra discount for cash 2 %
Till and Cupboard.....dis 25 %
American Padlocks.....dis 50 %
Scandinavian Pad Locks
₩ doz.....$10·50 10·50 12·00 12·00 13·00 13·00 } dis 15 %
No..... 9 9½ 10 10½ 11 11½ }
₩ doz.....$18·00 18·00 20·00 22·00 } dis 15 %
No..... 12 12½ 13 13½ }
Trunk Locks.....dis 5 @ 10 %
Thumb and Rogers's Latches.....dis 20 %
Lanterns.—Square Candle and Oil.....dis 10 %
Globe for Oil.....dis 10 %
" " Kerosene.....dis 10 %
Tubular Lanterns.....dis 10 %
Mattock.—Long and Short Cutter.....dis 25 %
Western Pattern.....dis 25 %
Pennsylvania Pattern.....dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 60 @ 60&10 %
Lincoln's " .....dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum...dis 10 @ 10&10 %
Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
Brass Liquor Cocks.....dis 20&10 %
Meat Cutters.—Dixon's.....dis 10 %
Woodruff.....dis 10 %
Stowe.....dis 10 %
Hale's.....dis 25 %
Stuffers.....dis 10 %
Planes.—Auburn Tool Co., "Bench".....dis 35 @ 35&5 %
Second Quality.....dis 50 %
Metallic Plane Co.....dis 35&5 %
Evans Pat. Circular.....net
Plane Irons.—American.....list net
Butcher's.....sold £, $5 50
Pi-k- —Philadelphia.....net
Pittsburgh.....net
Plumb- and Levels.
Stanley Rule and Level Co.....dis 60&10 %
Wm. Johnson, (Stanley List).....dis 60&10 %
Rakes.—Cast Steel Garden.....dis 33½ %
Malleable Garden.....dis 33½ %
Wood Head Iron Teeth.....dis 30 @ 40 %
Rules.—All Maker's Boxwood...dis 60&10 @ 60, 10&10 %
All Makers Ivory.....dis 50 %
Steelyards.—American Pattern.....dis 15 %
₩ doz.....$5·50 7·00 9·00 10·00 11·00 12·00
No..... 50 100 150 200 250 700
English Pattern.....dis 15 %
₩ doz.....$7·00 8·67 10·67 12·67 14·67 16·67
No..... 50 100 150 200 300 400
L. F. & C. Excelsior.....dis 10 %
₩ doz.....$9·00 10·00 12·00 15·00 18·00 21·00
No..... 50 100 150 200 250 400
Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....
Clipper No. 10, Boxed and Sharpened.....₩ doz. $11·00 net
" " 5, " " " 10·00
Common Scythes.....₩ doz $7·00 @ 10·00
Squares.—Steel and Iron, new list.....dis 50 %
Saws.—Disston's Cross Cut.....dis 12½ %
Disston's Hand.....dis 12½ %
W. McNiece's H'd, Cross-Cut & Circ'r, new list..dis 15 %
Boynton's Lightning, new list.....dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Sept. 1st.....dis 30 %
" Back Strap " .....dis 30 %
Oliver Ames & Sons.....new list dis 12½ %
Brady Shovel Co.....dis 12½&5 %
Sad Irons.—Richmond (polished face), per lb. 4 c. net
Richmond (polished face)... by the cask " 3¾c. net
Stone.—Arkansas Oil, No. 1..... ₩ lb $1·25
Turkey Oil, No. 1..... " 1·00
Washita Extra..... " 30c
" No. 1..... " 22c
" " 2..... " 18c
" " 3..... " 5½c
Screws.—Iron.....new list, Jan. 1st, 1874, dis 52½ %
Brass.....dis 5½ %
Spoons.—
Plated.....dis 40&5 %
Britannia.....dis 40&10 %
German Silver.....dis 20 %
" Light.....new list dis 15&5 %
Lalance & Grosjean Iron.....dis 10 %
Springs.—Gray's Door.....dis 40 %
Torry's Door.....dis 40 %
Stocks and Dies......dis 15 %
Stove Polish.—Gem.....₩ gross, $5·00
Onyx..... " $5·00
Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willis Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %
Tacks, &c.—Half Weight Tacks.....dis 72½ %
" " " by the case...dis 72½&7½ %
Clout and Finishing Nails.....7½ %
" " " by the case.....dis 7½ %
Traps.—Genuine Onelda—Newhouse list.....dis 20 %
Imitation " " " .....dis 30 %
Vises.—Solid Box..... ₩ lb net 15c
Wrenches.—Coes Genuine.....dis 40 %
Coes Imitation Wrought Bar.....dis 50 %
" " Malleable Bar.....dis 60 %
" " (Kellogg) Malleable Bar.....dis 50 @ 10 %
Tafts Pattern (Wrought Bar).....65 %
" " Kellogg's (Nail Bar).....dis 65&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %
Wire.—No. 0 to 18.....dis 40 %
No. 19 to 26.....dis 45 %
No. 27 to 36.....dis 45 @ 47½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 20 %
Galvanized Wire No. 0 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Sept. 12, 1874.

Augers—Snell Mfg. Co.....dis 20 %
Bits, Auger—Snell Mfg. Co.....dis 30 %
Bells, Cow—Jaws Genuine.....dis 30 %
Bolts—Carriage and Tire.....dis 75&10 %
Braces—Bit, Spofford's Patent.....dis 40&5 %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent.....dis 30 %
Butts—Brass.....dis 25 %
Wrought Narrow.....dis 30 %
" Broad, Loose Joint.....dis 35 %
" Table and Back Flaps.....dis 30 %
Wrought Butts, Loose Pin.....dis 35 %
Belting—Rubber.....dis 30 @ 35 %
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1·50
" Rutherford".....$1·00
Chalk—White, Carpenter's.....₩ gross, 50c
Red, Carpenter's " 75c
Blue, " " 90c
Chisels—Firmer Socket.....dis 60&10 %
Framing Socket.....dis 60&10 %
Corner Socket Chisels.....dis 60&10 %
Slick's Carpenters'.....dis 60&10 %
Castings—Malleable.....₩ lb 10c
Clothes Wringers, "Novelty" No. 2.....₩ doz $58 00
Elbows—Corrugated..... 5 5½ 6 7 } dis 10 %
Charcoal.....$9·50 4·50 5·25 6·50 }
Russia..... 7·00 9·50 12·00 14·00 }
Files—Maischoss Bros.....dis 50 %
Freezers Ice Cream—"Champion".....dis 33½ %
Hammers—Henry W. Kip's.....dis 7½ %
Hinges—Window Blind—
Clark's.....dis 50&10 %
Shepard's and Standard.....dis 55&10 %
Wrought Strap and T.....dis 30&10 %
Hods, Coal—Plain, Black and Galvanized.....dis 10 %
Funnel, Black and Galvanized.....dis 10 %
Fancy and Helmet.....dis 10 %
Palace Coal Vases.....dis 10 %
Hooks and Staples—Wrought.....dis 60&10 %
Hooks—Belt.....dis 50&10 %
Hasps and Staples—Wrought.....dis 60&10 %
Sad Irons.....4c
Kettles—Brass.....₩ lb. 50c
Enameled.....
Knives, Drawing—Oval No. 1.....dis 60&10 %
Razor Blade.....dis 50&10 %
Lanterns "Peerless,"....No. 1 5 10
₩ doz $26 00 $10 50 $13 75 dis 10 %
Tubular " "
" with Guards.....
Machines—Apple Paring, "Turn Table".....8·00 ₩ doz
Mills, Coffee—Box and Slide, common.....dis 15 %
Box Union and Eagle.....dis 15 %
" American.....dis 20 %
Nails—Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Finished & Pointed.....add 1c ₩ lb
" " 1000 lbs.....dis 5 %
" Clinton.....No. 6 7 8 9 10
22 20 19 18 17c
Packing—Rubber.....dis 50 @ 35 %
Pencils, Slate—Soapstone..... 4 5 6in.
30 40 50c ₩ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₩ lb 9 c
Rivets—Iron, Black and Tinned.....dis 25&7½ %
Rope—Manila, ½ inch and larger.....₩ lb 16½c
Screws—"American Screw Co"—
Flat Head, Iron.....dis 52½ %
Flat Head, Brass.....dis 52½ %
Staples—Blind, Boardman's Pat., ½ & ⅝.....₩ lb 37c
Spoons, Iron Tinned.....dis 10 %
" by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 40&10 %
Britannia.....dis 45&10 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₩ keg $6·00
Saws—Henry Disston & Sons.....dis 10 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 72½&7½ %
Vises—Parallel, Buffalo.....dis 20 %
Ware—French, Tinned and Iron.....dis 20 %
Stamped and Japanned.....dis 25 %
Cast Iron Hollow.....dis 10 %
Tin Plates.—Add for each X.....dis 33½ %
10x14, I.C. Charcoal...$11·25 | 14x20 C. terne.....$10·25
12x12, " ... 11·75 | 20x28 C. " ... 21·50
12½x17, " ... 10·75 | 20x28 X. " ... 26·00
14x20, " ... 12·25 |
Pig Tin—Straits.....38c @ 39c
Bar Tin.....39c
Solder.....No. 1, 18c; No. 2, 14c
Sheet Zinc—
"Lasalle".....370 100 lb casks
$10·00 10·30 ₩ 100 lbs
Sheets.....$10·00
Iron Wire—Bright and Annealed.....dis 40 %
Coppered.....dis 35 %
Tinned.....dis 15 %
Tinned Broom, { Nos. 20 21 22 } dis 20 %
20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₩ lb 33c
Planished.....₩ lb
Bottoms.....₩ lb 35c
Bolts.....₩ lb 35c
Braziers' Sheets.....₩ lb 37c
Sheet Iron.—
18 Common.....$4 95
24 Common.....5 10
24 W. D. Wood & Co., Smooth Finish.....5 90
Am. Russia..... A. 15c B. 12c
Gen. Russia, No. 1 stained.....18c
" " clean.....19c
Galvanized.....dis 15 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$11 50 @ 12·00
I. X. 10x14 Charcoal..... 14 50 @ 15·00
I. C. Terne 14x20..... 10·00 @ 10·25
I. C. Terne 20x28..... 21·50 @ 23·50
I. C. Continuous..... 24·00
Block Tin.—
Pig.....₩ lb 27c @ 29c
Solder.—
S. & Co.....₩ lb 23c
Lead.—Pig.....₩ lb 7½c.
Copper.—
Ingot.....₩ lb @ 24c
Planished.....@ 30c
Sheathing.....@ 33c
Copper Drops.....@ 32c
Zinc. Cask, 500 to 1000 lbs.....₩ lb
Case, 100 lbs.....
Slab.....
Brass.—
Roll, No. 6 to 20.₩ lb 30c
" 20 to 26. " 35c
Babbit Metal.—
Sellew & Co.....₩ lb 35c
Bars.....₩ lb 31c
A 1.....₩ lb 19c
Roofing ..... " 17c
Bar.....₩ lb 8½c
Sheets, 6 to 9 lb...₩ lb 33c
" 10 to 13 lb... " 35c
Braziers 13 lb..... " 32c
Copper Bottoms.. " 34c
10½c
11 c
7½c
Roll, No. 38 to 40...₩ lb 30c
Wire, No. 0 to 20...₩ lb 35c
" 20 to 26... " 40c
Aliens'.....₩ lb 20c
Market..... 12c
Aptimony.....₩ lb 11c
Bismuth.....₩ lb $4 00
Nickel.....₩ lb $3 50
Sheet Iron.— Planished A.....₩ lb 15c
Gen. Russia.....₩ lb 20c " B..... " 12½c
Smooth Smooth
Com. B. Fin. S. L. U. D Re'fd.
18 to 20.....4·4c 5·5c 7·5c
22 to 24.....4·6c 5·6c 7·6c
26.....4·8c 5·8c 7·8c
27.....5·0c 6·0c 8·0c
Gvanulized Iron.—Full oundles.....dis 20 %
Nos. 18 to 20.....12c | No. 26.....14c
22 to 24.....13c | 27.....15c
Bar Steel.—Silver, ₩ lb 10c; Crescent, 21c.
Iron Wire......dis 35 %
Enameled Ware......dis 45 %
One Piece Corrugated Elbows......dis 10 %
Charcoal Iron. Russia Iron.
4½ inch.....₩ doz $2·50 | 4½ inch.....₩ doz $5·00
5 " ..... " 3·50 | 5 " ..... " 7·00
5½ " ..... " 4·50 | 5½ " ..... " 9·50
6 " ..... " 5·25 | 6 " ..... " 12·00
7 " ..... " 6·50 | 7 " ..... " 14·00
Leader Elbows, Flat Crimp Retinned or Galvanized.—Dis. 10 %
₩ doz. ₩ doz
2-inch.....$1 75 | 2½-inch.....$2 75
3-inch.....2 25 | 3½-inch.....3 25
4-inch.....2 50 | 4½-inch.....3 50
Sheet Iron Bread Pans......₩ lb 10c
American Broilers......₩ doz. $13·50
Tinmen's Machines......dis 5 %
Sad Irons......₩ lb. 3½c
Brass Kettles.—Ansonia.....45c
Dog Irons......3½c

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, c, card rate, 2 % off net.

Flat Rail (1½x¼), punched and coun'sunk..4·4c ₩ lb net
Iron Wedges.....4½c ₩ lb net
Norway Nail Rods.....9¾c ₩ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....5c ₩ lb net
Beetle Rings.....8¾c ₩ lb net
Fence Pickets—
⅝ round, bent to shape, 30c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts (new list).....70&10 % off net
Plow Bolts.....30, 10&5 % off net
Stove Bolts.....15 % off net
Machine and Square Head Bolts.....30&10 % off net
Coach and Lag Screws.....30&10 % off net
Bolt Ends.....35 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....7½c ₩ lb off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in.....6 c ₩ lb off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅝ in.....8 c ₩ lb off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅝ in.....7 c ₩ lb off net
Nuts and Washers in 25 lb. boxes, 1c ₩ lb ex. Nuts and Washers in 5 lb. boxes, 1½c. ₩ lb ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 3½c ₩ lb net; ⅞, ¾ in. diam. 3¾c ₩ lb net; ⅝ in. diam. 4c ₩ lb net.
Patent Headed Harrow Teeth, packed in casks, ¾c ₩ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5¼c ₩ lb net; 9-16 in. diam. 6¼c ₩ lb net; ½ in. diam. 7½c ₩ lb net. 1c ₩ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ¾ to 1 in. diam. 9c ₩ lb net; ⅝ in. diam. 10c ₩ lb net; ½ in. diam. 12 c ₩ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 16 in. long, 5¼c ₩ lb net; 8, 10 & 12 in. long, 6¾c ₩ lb net
Strap and T Hinges.....20 & 10 % off net, delivery as customary.
For purchases amounting to $250 between May 30th and December 31st, 5 % extra off.
Screw Hitching Rings.....$5 25 ₩ 100 net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net
Cast Iron Washers.....₩ lb 4c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ lb 4 c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 4¼c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 4¼c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long..... " 4¾c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long " 5¼c net
Bridge bolts with upset ends.....¾c. ₩ lb extra
Wrought iron plates, punched.....5c. ₩ lb net

WAGON HARDWARE.

Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₩ set of 3 bolts.. 55c
12 " ½ " " 3 " .. 70c
10 " 9-16 " " 3 " .. } 90c
12 " 9-16 " " 3 " .. }
14 " 9-16 " " 3 " .. $1 00
10 " ⅝ " " 3 " .. } 1 00
12 " ⅝ " " 3 " .. }
14 " ⅝ " " 3 " .. 1 10
16 " ⅝ " " 3 " .. 1 20
3c ₩ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....18c
" " wide track, each.....20c
Single Tree Irons, ₩ set of four pieces.....38c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....60c
" " " 3 " " 65c
" " " 3¼ " " 70c
" " " 3½ " " 75c
Wagon Brake Ratchets, each.....16¼c
" " " finished with guard, each..45 c
Wrought Hammer Straps, heavy pattern, each.....16 c
" " " light " each.....13½c
" Rub Irons, each.....11 c
Stay Chain Hooks, each.....8 c
Double and Single Tree Clips, figure 1, each.....9 c
" " " 2, each.....10 c
" " " 3, each.....12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 50 sets.....dis 25 %
Wagon Box Staples, 1½ to 2¼ in. to clinch. ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on. ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¾c net
" " " with ⅝ rings, each.....7¼c net
King Bolts, ⅝, 1, 1¼, and 1¼ in. diam.....₩ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths..... " 8½c net
Wagon Rivets, 3-16 in. diam., all lengths..... " 9½c net
" & Nails, in 5 lb paper boxes....₩ lb 1c extra
" " in 25 lb wood ..... " ½c extra
Wagon and Hinge Nails, ¼ in.....₩ lb 17 c net
" " 3-16 in..... " 19 c net
Double Tree Plates..... " 8½c net
Coupling " ..... " 8½c net
Tongue " ..... " 9 c net
Neck Yoke Plates..... " 11 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₩ lb 10½c net. ¼ in., 11½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal
IC, 10x14.....$11 25
IX, 10x14..... 14 00
XX, 10x14..... 16 75
IC, 12x12..... 11 75
IX, 12x12..... 14 50
IC, 14x20..... 13 25
IX, 14x20..... 16 00
XX, 14x20..... 17 75
XXX, 14x20..... 20 50
XXXX, 14x20..... 23 25
DC, 100 Plate..... 10 75
DX, " 12 50
DXX, " 16 25
DXXX " 18 00
DXXXX 100 Plate.. 21 75
IX, 14x14..... 28 25
IC, 10x14 W..... 10 75
IX, 10x14 W..... 13 50
Roofing Tin.—Best Char.
IC, Terne, 14x20.....$10 25
IX, " 14x20..... 13 00
IC, Terne, 20x28..... 21 50
IX, " 20x28..... 43 50
Coke Tin.—
IC, 10x14 Coke..... 10 50
IX, 10x14, Coke 12 25
IC, 14x20, " 10 50
Sheet Zinc.—
Any width.....11c
Copper.—
Sheathing.....32c
Copper Bottoms.....32c
Planished Copper.—
Sheathing, 14x48.....30c
Boiler Size, No. 7.....41c
" " No. 8.....41c
" " No. 9.....41c
Tinning ₩ sheet, 14x48 10c
" " No. 7 10c
" " " 8 14c
" " " 9 16c
Pig Tin.—
Large Pigs.....29c
Small Pigs.....29c
Bars.....30c
Solder.—No. 1..... 17c
No. 2..... 16c
Bright Wire...dis 37½ %
Sheet Iron.—
No. 18 Am. Com.....4 80
No. 24 Am. Com.....5 00
Russia. No. 9, 10, 11 & 12..13¼c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $6 10
" 21 to 24..... 6 30
" 25 & 26..... 6 60
" 21 to 24 Charl.. 7 80
" 25 & 26 " .. 8 00

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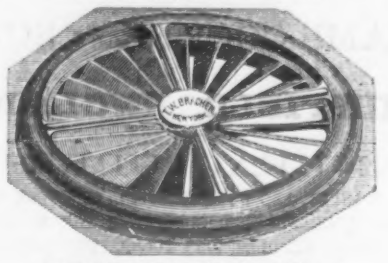
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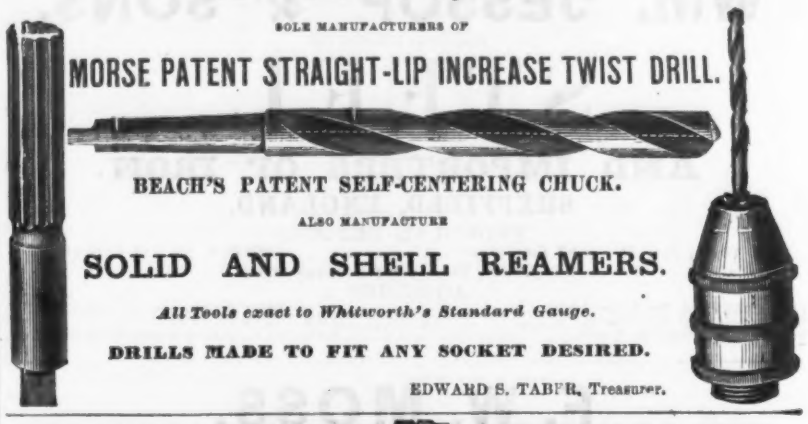
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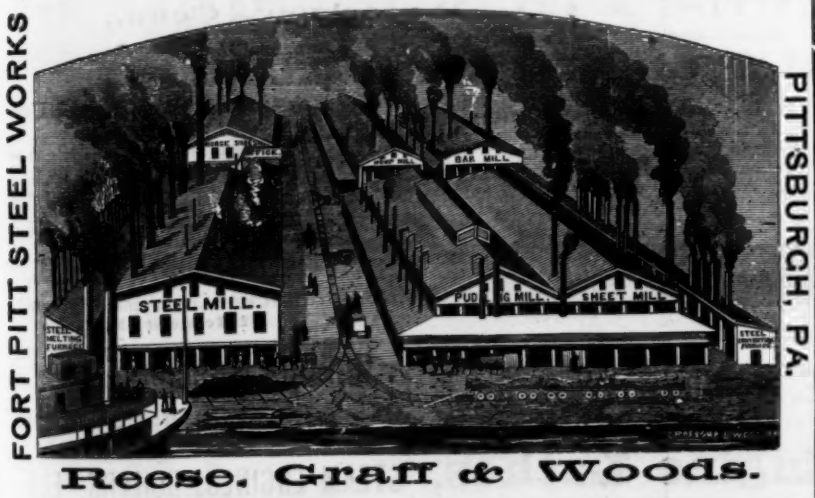

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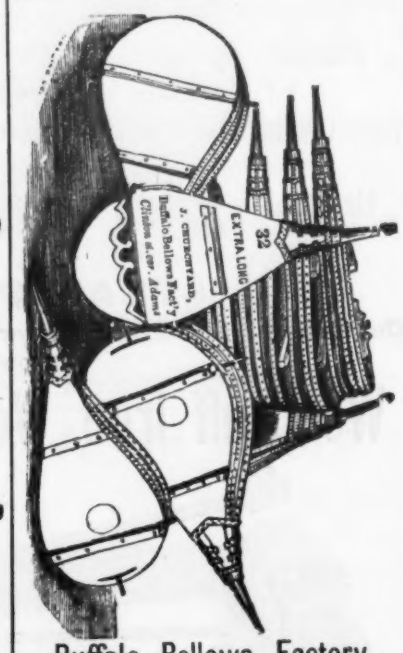

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Tin Plate.—

10x14, IC, Ch'l. Good.	$	14x20, IX, Ch'l Best.	$15 50
10x14, IC, " Best.	13 00	14x20, IXX, " "	18 00
10x14, IX, " "	14 50	14x20, IXXX, " "	20 50
12x12, IC, " "	12 50	DC, 100 Plate, " "	12 00
12x12, IX, " "	15 00	DX, " "	14 50
14x20, IC, " "	13 00	DXX, " "	17 00
Roofing IC, Charcoal, Best		DXXX, " "	19 50
Roofing IX, Charcoal "			11 50
20x28, IC, Charcoal Roofing, Com			14 00
20x28, IC, " Fair			22 00
20x28, IC, " Best			23 00
20x28, IX, " "			27 50
10x14, IC, Coke Plates			10 00 @ 10 50
14x20, IC, "			10 50 @ 11 00
10x20, IC, "			16 50

Block Tin.—

Large Pigs	30c	Bars	32c
Small "	31c	Straits, 2c. higher.	

Zinc.—Sheet, 500 to 1000 lb. Casks, 10¼c
Loose Sheets, 10¼c
Slab Zinc or Spelter, 6¾ to 8c

Copper.—Bottoms, 35c
Sheathing, 33c
Planished, 36c
" Boiler lengths, 40c
Ingot, 24c to 26c
Bolt, 40c

Braziers' Sheets.—

30x60, 6 to 10 lbs.	41c	30x60, 15 to 100 lbs.	35c
30x60, 10 & 12 lbs.	38c		

Solder.—F. S. & Co.'s make.

Best Fine	22c	Roofing	18c
No. 1	20c	Braziers' or Shelt. Sold.	35c

Antimony, 18c
Babbit Metal—F. S. & Co.'s, 16c
No. 2, 14c

Sheet Iron.—

	Common.	Smoth. Com.	Smooth Charcoal.	Smooth Juniata.
No. 24	5 c	6 c	7¼c	9¾c
25 & 26	5¼c	6¼c	7¾c	9¾c
27	5½c	6½c	8 c	10 c

Galvanized Iron, dis 20 %

No. 16 to 20	12c	No. 27	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—

Perfect	20c	No. 1 Stained, In Sheets, 1c. higher.	19c
American Russia.—		B	10½c
A	15c	In sheets, 1c higher.	
Lead.—		Lead Pipe, in full coils	8¼c
Pig	7¼c	Lead Pipe, when cut,	8¼c
Bar	8¼c	Sheet Lead	8¼c

Wire—Bright, dis 35 %
Coppered, dis 30 %

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Augers.—Watrous Ship, dis 10 %
L'Hommedieu Ship, dis 15 %

Axes.—Forester's Favorite, Bronzed, $12 00
Blue Jackets, Blue, 11 5
Excelsior, Black, 11 00
Chopper's Pride, Bronzed, 10 50
Red Cross, Red, 10 00
Red Cross, Handled, 12 50
Boy's Handled Blue Jackets, 12 00

Axe Handles.—Wadleigh's Oak—
A (Extra) $2 50. B (No. 1) $2 00. C (No. 2) $1 50 ₱ doz

Bells, Sleigh—
Fancy Body, Patent Leather, Cloth Bound, White Metal, 30, No. 1, $1 70
Fancy Body, Patent Leather, Cloth Bound, White Metal, 36, No. 1, 1 80
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 30, No. 1, 2 25
Fancy Body, Patent Leather, Leather Bound, Extra Tinned, 36, No. 1, 2 50
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 30, No. 1, 3 38
Fancy Body, Patent Leather, Leather Bound, Silver Plated, 36, No. 1, 3 50
Shaft, Strap, White Metal, House Bells, extra, 6, No. 1, per pair, 50c.
Common, 6, No. 1, " 45c.

Blind Hinges.—Washburn's, per hundred set $8 75
Blind Fasts.—Washburn's, per hundred set $5 75
Bolts.—Carriage, Phila., "Girard Works, dis 50&10 %
Borax.—Best Refined, ₱ lb 14c
Borers.—Angle, Backus', dis 30 %
Boring Machines.—Angle, each $4 75
Common, Snell's quality, each 3 75
Braces.—Barber's, dis 40&5 %
Backus', dis 50 %
Spofford's, dis 40 %
Amidon, dis 45 %
Brass Faucets.—L. F. & C., dis 25 %
Butts.—Union Drilled Loose Joint, dis 60&10 %
" " Wire Fast Joint, dis 55 %
" " Acorn Loose Joint, dis 60&10 %
Brass Butts, dis 30 %
Wrought Table Butts and Back Flaps, dis 30&10 %
Wrought Narrow Butts, dis 30&10 %
Can Openers—Sprague's, dis 50 %
No. 1, Iron Handle, $4 00
No. 2, Wood Handle, 4 50
Cartridges.—" U. S. Cartridge Co." dis 50&10 %
Chisels.—"Buck Bros.' Shank Goods, add 20 @ 22½ %
Socket, add 22½ @ 25 %
Coal Hods, dis 35 %
Fancy Japanned, No. 4, 15 in., $8·00; 5, 16 in., $9·00; 6, 17 in., $10·00.
Fancy Galvanized, No. 4, 15 in., $11·50; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Perfection, Galv'd, No. 4, 15 in., $15·00; 5, 16 in., $16·00; 6, 17 in., $17·00.
Morning Glory, Jap'd, No. 4, 15 in., $12·00; 5, 16 in., $13·00; 6, 17 in., $14·00.
Morning Glory, Galv'd, No. 4, 15 in., $15·00; No. 5, 16 in., $16·00; No. 6, 17 in., $17·00.
Compasses and Dividers.—Bemis', dis 33 %
P. S. & W., dis 25 %
Cordage.—Manila (usual trade dis.), ₱ lb, 18c
American Tarred Hemp Lath Yarn, ₱ lb, 10c
Corn Hooks, per doz $2·75
Cow Ties, dis 10 %
No. 30, Open Ring, 3 foot, No. 6, with Toggle, $3·70
No. 35, " 3 " No. 6, " Snap, 3·90
No. 40, " 3½ " No. 5, " Toggle, 4·23
No. 45, " 3½ " No. 5, " Snap, 4·40
No. 50, " 4 " No. 4, " Toggle, 4·85
No. 55, " 4 " No. 6, " Snap, 5·00
No. 60, " 4½ " No. 3, " Toggle, 5·60
No. 65, " 4½ " No. 3, " Snap, 5·80
Crow Bars.—Iron. Steel Points, ₱ lb, 5½c
"Sweet" Steel Bars, ₱ lb 11c
Brown's Steel Bars, ₱ lb 10c
E. P. & Co. Extra Drill Steel, ₱ lb 15c
Dividers.—Cook's Nickel Plated, dis 15 %
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00, dis 25 %
No. 8, " outside " $18·00, dis 25 %
Torrey's, $4·00
Emery.—Alden, ₱ lb 6½c
Wellington Mills, ₱ lb 10c
Files.—Earl Smith & Co.'s English, 45 to £ gold
American, 45 to £ currency, less 12½ %
Nicholson, 45 to £ currency, less 1½ %
" Regular Taper, dis 12½&2½ %
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62; 4, $1·88; 4½, $2 13; 5, $2·50.

Funnel Irons.—

$2·50	2·50	2·50	3·25	per doz
Deep Flange.—$3·50	5,	5½,	6,	7 inch.
	3·25	4·00		
	5,	5½,	6 inch.	

Hammers.—Maydole, dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1¼, $9·75
" " " " bell face, No. 1, $11: 1¼, $9·75.
Hangers & Rollers.—Novelty, dis 30 %
Anti-Friction, $1 75 per pair—dis 30 %
Hatchets.—Underhill Edge Tool Co., dis 15 %
C. F. Dowse, warranted Cast Steel—
Shingling, 0, $4·75; 1, $5·25; 2, $5·75
Clay, 1, 5·75; 2, 6·25
Lathing, 1, $5·50
Axe Pattern, 1, $7·00; 2, 7·50
Broad, 0, $5·25; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75; 5, $12·75; 6, $14·75.
Hinges.—Strap and T, Stanley Works, dis 25&10 %
Plate, Loose and Fast Joint, ₱ lb 7½c
Wrought Screw Hook, ₱ lb 8c
Hoes.—Ely Balch & Co. M., B. & D.'s list, 1874, dis 25 %
Remington, M., B. & D.'s list, 1874, dis 30 %
Lanterns—Tubular No. 0, $9·50
Guarded, No. 74, (with kerosene oil and candle burners), 6·25
Lead.—Sheet and Pipe, 8c—less 10 %
Locks.—P. & F. Corbin, new list dis 45&5 %
Nashua, dis 45&5 %
Manure Forks,
Myers & Ervien, M., B. & D.'s list, 1874, dis 25 %
Peck, Clark & Co., " " dis 25 %
Shumway & Co., " " dis 30 %
Mattocks.—K. P. & Co., axe finish, long cutter, $13 75
Short cutter, 13 50
Meat Cutters.—"Miles's" Challenge, dis. 30 %
No. 1, $22·00; 2, $30·00; 3, $40·00.
Metal.—Babbitt, No. 1, 38c; 2, 25c; 3, 16c; 4, 15c ₱ lb
Nails.—10d and larger, $3 60
Nail Putters.—Little Giant—Small, per doz., $22·00
Little Giant—Large, " 30·00
Padlocks.—Wilcox, dis 50&2 %
All Brass, 2½ inch, 2 keys, job lot, $9 00
Picks.—K. P. & Co., Polished Points—
5 to 6, per doz $9 00; 6 to 7, $9 50
Pins.—Universal Hat and Coat all wood—
2 in., ₱ gross $2 50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Potato Digger.—
" Partridge," 6 square tine, ₱ doz $12 00
Shumway & Co., 6 round tine, ₱ doz 9 00
Pulley Blocks.—"Best Boston Make," net
Common Strapped Blocks—

4	5	6	7 inch.
Single, 75c.	85c.	$1·00	$1·13 each.
Double, $1·00	1·12	1·25	1·60 "

Inside Iron Strapped Blocks—

5	6	7	8	9	10 inch.
Single, $1·00	1·12	1·38	2·00	2·25	1·75 each.
Double, 1·88	2·00	2·62	3·63	4·00	5·00 "

Inside Iron Strapped Blocks, with Patent Roller Bushings—

5	6	7	8	9	10 inch.
Single, $1·25	1·50	1·65	2·00	2·65	3·50 each.
Double, 2·50	3·00	3·38	4·63	5·00	6·50 "

Plated Ware.—Rogers bros., new list dis 40&10 %
Plumb & Levels.—" Davis" Pat. Adjustable—
No. 1, Iron and Wood Center Levels, dis 50 %
No. 2, First Quality Levels, dis 60&10 %
No. 3, Iron Pocket " dis 35 %
No. 4, Level and Plumb Glasses, dis 60&10 %
No. 5, Iron Pocket Levels, per square and straight edge, dis 50&10 %
No. 6, Improved Iron Bench Planes, dis 20&10 %
Pocket Knives.—Comm. Cutlery Co., new net list
American Shear Co., dis 33⅓ %
Rakes.—Cast steel, garden, dis 30 %
Malleable, dis 25 %
Rail Barn Door.—For Novelty and Anti-Friction Hangers, per foot 7c., dis 30 %
Rivets.—Black, dis 35 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, 13 13 14 14 15 16c ₱ lb net
Rubber Moldings.—" Harmon's" dis 10 %
No. 2, for Windows, per foot, 8c
No. 3, for Doors, per foot, 10c
No. 4, " per foot, 12c
Sad Irons.—Bliss & Drake, ₱ lb 4
Sand Paper—0 to 2, $4·25; 2 to 3, $4·75, dis 10 %
Saws.—*Hand and Panel—*
Wheeler, Madden & Clemson's, same list as "Diston's," dis. 10 %
Diston's, dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts, per ft., 37c
" " " "Star" X Cuts, " 60c
" " " Champion X Cut, " 90c
" " " One Man X Cut, each, $2·25
Boynton's genuine Lightning X Cut, per ft., 60c
" " " One Man X Cut, each, $2·25
Circular—Wheeler, Madden & Clemson's, dis. 25 %
Mill—Aiken's, dis. 25 %
Scythe Stones.—
"Willoughby Lake," first quality, ₱ gross $6 00
" " second quality, " 3·00
Shovels.—O. Ames, new list dis 12½ %
M. B. & D., new list dis 12½ %
Snow, Malleable Iron Tip, D Handle—Agents for New England, $6 50
Snow, Malleable Iron Tip, long Handle—Agents for New England, 5·50
Sifters.—Coal, Rice, &c., $12 00
Spading Forks.—M. & E., dis 25 %
Stone Pickers.—"Partridge," original, ₱ doz $15 00
Tools.—Aiken's Pattern, 20 in set; Parr's, $8·00 per set
Traps.—Oneida, dis 20 %
Blake's, dis 50 %
Vises.—K. P. & Co.'s Solid Box, Blacksmith, ₱ lb 13c
Parker's Parallel, dis 10 %
Backus, dis 25 %
" Howards" Parallel, dis 20 %
Wardrobe Hooks.—Wire to drive, ₱ gross $1 00
Weather Strips.—"Harmon's" per doz $3, dis 10 %
Weights.—Window Weights, ₱ lb 2¼c
Wedges—Axe, ₱ doz 35c
Wire.—
Eureka, in spools, No. 28 to 40 assorted, ₱ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black, ₱ ft 6c
Wrenches.—Genuine Wrenches, A. G. Coes, dis 40&5 %
Wringers.—

Novelty and Universal	Tub No. 2	market unsettled

Eureka, per doz $60 00
Novelty Bench, No. 4, market unsettled

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.—₱ box

I. C. Char. 10x14	@ $11 50		
I. C. Coke 10x14	9 50		
Char. Roof, IC, 14x20, 11 25			
Coke " IC, 14x20, 10 25			

Pig Tin.—

	₱ lb		₱ lb
Banca	30c	Pig	24c
Straits	32c	Sheet & Pipe, 34c, dis 10 %	
English	28c	**Spelter**	₱ lb 8c
Zinc.—Sheet	₱ lb 10c	**Antimony**	₱ lb 14c

Iron.—Sheet Iron, Russia, 18c
Sheet Iron, English, " 5 c
" " American Refined, " 5¾c
" " Galvanized, " 10c
Plate Iron, " 5¾c
Swedish and Norway Bar Iron, gold, ₱ ton, $130 00
" " Shapes, gold, 125 00
Norway Nail Rods, first quality, gold, 145 00
" " second " " 135 00
Best Refined Bar Iron, 65 00
The "Burden Best" Iron, 95 00
American Pig Iron, Foundry, No. 1, x, 33 00
" " No. 2, x, 31 00
" " Gray Forge, 28 00
Scotch Pig Iron, ₱ ton 36 00 @ 39 00
Wrought Scrap Iron, 35 00

Steel.—

	₱ lb		₱ lb
Eng. Tool	18c	German	10c
American Tool	14½c	Spring	7½c
" Mach	10c	Tire	6½c
Bessemer	7½c	Sleigh Shoe	4¾c
		Toe Calk	7¾c

Copper.—

	₱ lb
Sheathing	33c
Bolt	35c
Pig	22c
Sheet & Pipe, 34c, dis 10 %	
Spelter	₱ lb 8c
Antimony	₱ lb 14c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror, ₱ doz, $8 50
Hudson's Rotary, " 9 00

Axes.—James & Co.'s, " 11 50
Pioneer, " 12 50
Lippincott's, " 12 00
Hunt's, " 12 50

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles, Swelled Taper, Concord and Red Jacket Axles, list net
Comanche Axles, 1¾ inch and upward, ₱ lb 7¾c
" " less than 1¾ inch, " 7¾c

Bellows.—Best St. Louis make, 60c ₱ in. dis 15 %

Bells.—Troy, Church, School and Farm Bells, ₱ lb 43c

Belts.—Arms, Bell & Co.'s Carriage and Tire, dis 75 %
Arms, Bell & Co.'s Machine, dis 20 %

Butts.—Western Butt Co.'s—
Narrow Fast Joint, dis 25 %
Broad Fast Joint, dis 50 %
" Loose " dis 60 %
Reversible, dis 50&10 %
" Japanned and Silver Tipped, dis 50 %
Loose Joint "Acorn" " " dis 55 %

Corn Cutters or Hooks.—Solid Steel, ₱ doz $4 00

Corn Knives.—Dunn E'ge T'ol Co.'s Clip, " 5 75
Seymour Mfg. Co.'s Solid Steel Back, " 5 00

Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers, dis 10 %
Hand Shellers, Special rates

Cotton Gins.—Dubois Patent, dis 10 %

Crow Bars.—Steel Pointed, ₱ lb 7c

Drag Saw Machines.—
Culver's Iron Drag Saw, dis 10 %
Robinson's Patent Sweepstakes Drag Saw, dis 10 %

Fanning Mills.—Nash & Cutt's, dis 15

Feed Cutters.—Burdick's National, dis 15 %
Baldwin's American, dis 15 %
Sanford No. 1, $12 00; No. 2, $8 25, net

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks, dis 33⅓ %
" " Handled Hoes, dis 35⅓ %

Grinding Mills.—French Burr Mills, net list
Challenge Feed Mills, dis 20 %
Sedgebeer's Nonpareil Mills, dis 10 %
Osage Corn and Cob Mill, dis 20 %

Hammers.—Masons' Hammers, ₱ lb 20c
Smiths' Hand, 28c

Handles.—No. 1 Fork, Hoe and Rake, dis 20 %
No. 2 Fork, Hoe and Rake, dis 40 %

Harrow Teeth.—1 inch iron, ₱ lb 4½c
⅞ and ¾ inch iron, " 4¾c
Barbed or Headed, ½c extra

Hay and Cotton Presses.—
Dederick's Railroad, dis 5 %
" Perpetual, net

Hay Knives.—
Dunn Edge Tool Co.'s, ₱ doz $14 50—dis 15 %
Lightning (Weymouth's Patent), ₱ doz $4·00

Horse Hay Fork.—Nellis' Harpoon, dis 25 %

Horse Nails.—National Patent Pointed, 20c rates
National Patent Pointed, extra finished, 25c "

Horse Powers.—Pitts or Carey's Patent, dis 10 %
Wheeler's Railway, dis 10 %
Sandwich Lever, dis 10 %

Horse Rasps.—Heller Bros, dis 45 %

Horse Shoes.—
Rhode Island (Perkin's Pattern), ₱ keg, $6 50
" Mule, " 7 50
" Trotting Shoes, " 9 00

Mattocks and Grub Hoes—
Klein, Logan & Co.'s Mattocks, ₱ doz $14 75 @ 15 25
" Grub Hoes, oval eye, " 10 75 @ 12 00

Nails.—Wheeling, $3 70 rates
Order for 500 kegs 15c per keg less.

Picks.—Klein, Logan & Co.'s Railroad and Clay, ₱ doz $10 50 @ 11 75
Klein, Logan & Co.'s Coal, " 8 00 @ 9 00
" " Pick, " 12 00
" " Stone, " 15 00
" " Tamping, " 17 50

Plows.—Avery's Cast and Steel, dis 15 %
Collins Cast Steel, new list net
Pekin Steel, new list net

Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32, dis 30 %
Kane & Paddock's Premium Sulky, $30 00 net
St. Louis Revolving 14 tooth, 5 50 net
" " 16 " 6 00 net
" Hand Hay Rake, dis 10 %

Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives, dis 20&5 %
" " Sections, dis 25 %

Road Scrapers.—Steel, dis 25 %
Cast Iron, dis 10&2½ %

Sad Irons.—Monitor Brand, Silver Polished, ₱ lb 5½c

Sash Weights.—Standard Solid Eyes, ₱ lb 3½ c

Saws.—Hubbard, Lippincott, Bakewell & Co.'s, dis 10
Branch, Crooks & Co.'s, dis 15

Scythes.—Dunn Edge Tool Co.'s, new list dis 25

Scythe Stones.—No. 1 Ind'n Pond, ₱ gr's, $7 00
Extra Indian Pond, " 7 50
Premium, " 9 50
Diamond Grit, " 13 50
} dis 25

Shovels, Spades and Scoops.—
Lippincott's, dis 30 %

Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished, ₱ lb, 15c
Solid Cast Steel, " 25c

Snaths and Cradles.—Seymour Mfg. Co.'s, dis 20 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express, dis 10 %
Blue Seat Springs, dis 15 %

Thimble Skeins.—Pump & Skein Co.'s, dis 60 %

Vises.—Solid Box, ₱ lb 16c
Wilson Mfg. Co.'s, dis 15 %

Wheelbarrows.—Railroad & Garden, new list net

Wrenches.—Coes' Genuine, dis 25&5 %
Coes' Pattern, dis 50 %

Wringers.—Crown, ₱ doz $40 00

Wagons.—Whitewater Farm Wagons—
Thimble Skein, No. 3, $60; 3½, $64; 3½, $65
Iron Axle, No. 1½, $65; 1⅝, $90; 1¾, $95

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Char.	$11 00@11 50	IX, continuous, 20 in. x 200 ft.	
IX, 10x14, "	14 00	IC, 10x14, best	
IC, 12x12, "	12 00	Coke	$10 00
IX, 12x12, "	14 50	IC, 10x14, good	
IC, 14x20, "	17 50	Coke	10 00
IX, 14x20, "	15 00	IC, 10x20	17 00
IC, 14x20, Terne	$10 75@11 00	IC, 14x20	19 50
IX, 14x20, "	18 50	IC, 14x20, Coke Lead	9 00
IC, 20x28, "	21 00@22 00	IX, 20x28, "	18 00
IX, 20x28, "	25 00@26 00	IC, 10x14, punch'd for Safes	10 00
IC, continuous 20 in. x 200 ft.			

Block Tin.

Large Pigs Straits	28c	Bars	30c
Small " English	27c		

Sheet Zinc.

Casks	₱ lb 10c	Sheet	₱ lb 10½c

Solder.

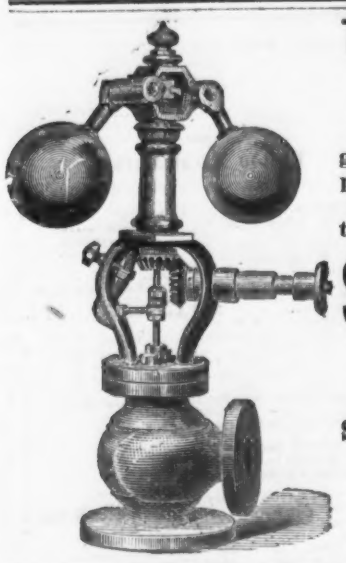
No. 1, Refined, in bars or plate	17c
No. 2, " " "	16c
Pig Lead	7¼c

Sheet Copper.—18 to 100 lbs. Sheets 30x60, 32c
14 to 16 lbs., Sheets 30x60, 32c
10 to 12 lbs., " and 30x72, 35c
6 to 9 lbs., " 38c
Tinned, 14 and 16 oz. 14x48, 31c
Planished, 14 and 16 oz. 14x48, 37c
" No. 7, 8 and 9, 39c
Copper Bottoms, 48c

Sheet Iron.—

	Com'n.	Sm'th.	Char I.	Jap'ns.
No. 16 to 20,	4¾c	5¾c	7¼c	9¾c
No. 22 to 24,	4¾c	5¾c	7¼c	9¾c
No. 26,	5 c	6 c	8 c	9¾c
No. 27,	5¼c	6¼c	8¼c	10c

Galvanized Iron, dis 20 %
Iron Rivets, dis 25 %
Iron Wire, dis 25 %
Coppered Market Wire, dis 30 %
Copper Rivets and Burs, dis 25 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₱ lb, 30c
No. 1 stained, ₱ lb, 19c
Imitation Russia, ₱ lb, 13c
Retinned Stamped Ware, dis 20 %



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We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

ShiveGovernorCo

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR.

The Best and Cheapest Watcher of the Watchman made

PRICE ONLY $15.

Circulars sent free.

The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making

Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

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No. 24 Columbia Street, New York,

MAKER AND PATENTEE OF

Hydraulic Jacks and Punches,

ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

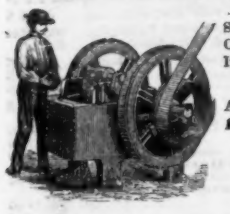
Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

BLAKE'S PATENT

STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds o hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

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BLAKE CRUSHER CO., New Haven, Conn.

Persons visiting New York, can be shown a crusher in operation at 197 Elm St

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STAVE SAW.

Gauge Lathes, Screw Machines,

Stave Saws, Woodworth Planers,

Tub, Pail and Chair Machinery a specialty, by

GOODSPEED & WYMAN, Winchendon, Mass.

CORLISS STEAM ENGINE.

The Best in the World for Economy in Fuel and Cost of Running.

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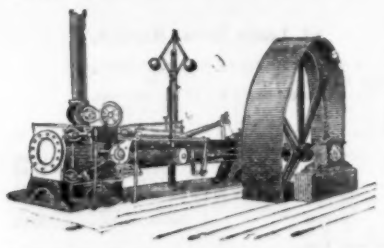

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Engineers, Machinists, Founders,

And BOILER MAKERS.

Stationary Engines, Shafting, Mill Gearing, Hoisting Machines, Improved Piston Packing and Machinery.

Special attention given to Boring Ports and Cylinders.

Philadelphia Forging Works.

MANUFACTURERS OF

Wrought Iron Carriage & Wagon Hardware

AND ALL DESCRIPTIONS OF

Steel & Iron Drop Forgings

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Guild & Garrison's Steam Pump Works,

Nos. 30 to 34 First Street, Williamsburgh, N. Y., Manufacturers of

Steam Pumping Machinery

Of all descriptions and for all purposes, of any proportion or size, for pumping Hot, Cold, Fresh, Salt, Muddy or Gritty Water, Grain-mash, Syrups, all kinds of Beer, Acids, Molasses, and all heavy and thick fluids. Also for Feeding Steam Boilers, Supplying Tanks, and for Sugar Refineries, Tanneries, Oil Refineries, Gas Works, Hotels, Breweries, and for all classes of manufactories; for Draining Mines and Excavations, and for Rolling Mills, Blast Furnaces and Water Works supplying Cities, Towns and Villages with Water; also, for Wrecking purposes and Steam Fire Engines for Land and Sea.

Also, Manufacturers of Vacuum Pumps, Duplex and Single, and Copper or Iron Vacuum Pans of all sizes and for all purposes, with complete fixtures for Refining Sugar, Corn Syrup, Glue, &c., or for condensing Milk, Extracts, Chemicals, &c., &c.

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All Work from this Establishment fully Warranted.

A Written Guarantee given with our Pumps.

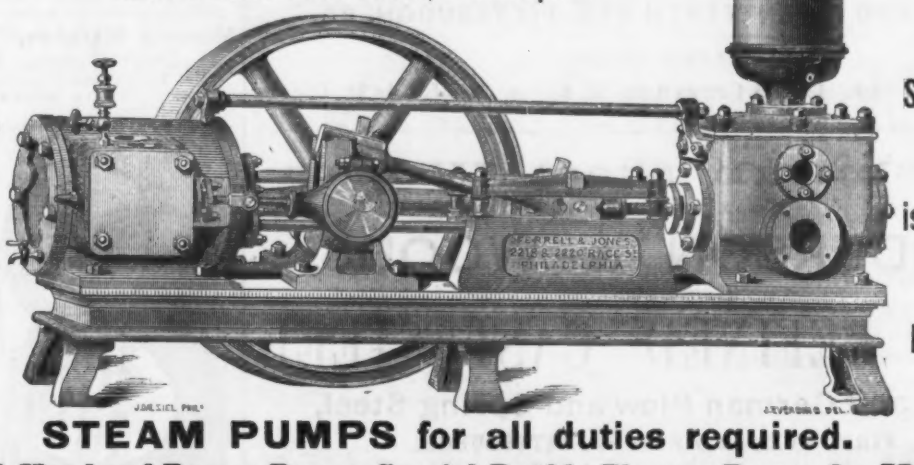
ENTERPRISE HYDRAULIC WORKS,

2218 & 2220 Race Street, Philadelphia.

Fan Blowers.

Piston Blowers,

"FOULDS" Patent Water Elevator.



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STEAM PUMPS for all duties required.

Centrifugal, Hand and Power Pumps, Special Double Plunger Pumps for Mining Purposes. Boiler Feed and Tank Pumps.

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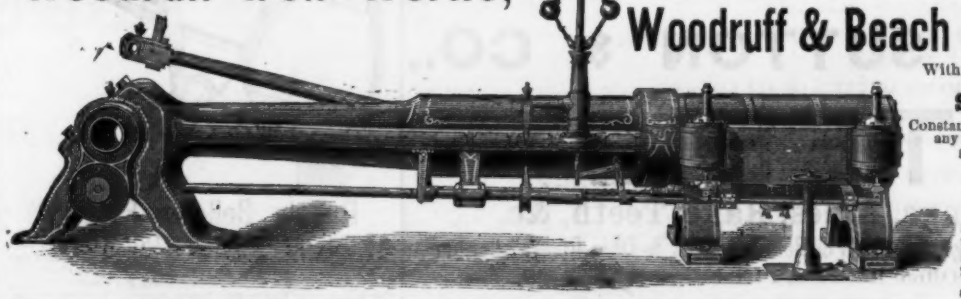

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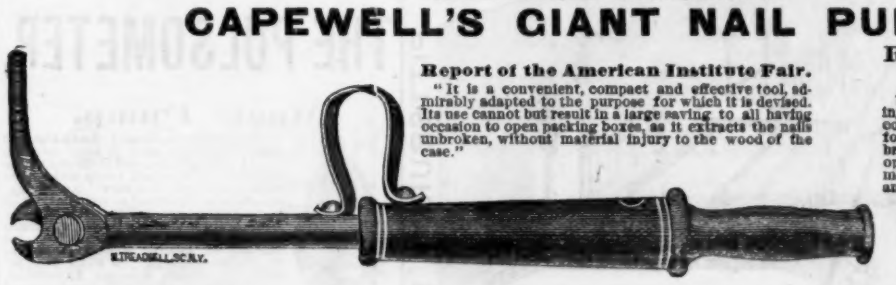

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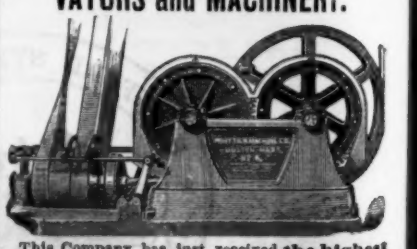

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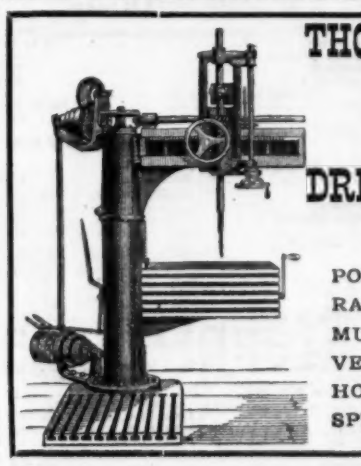

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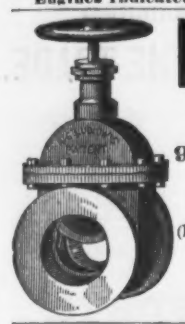

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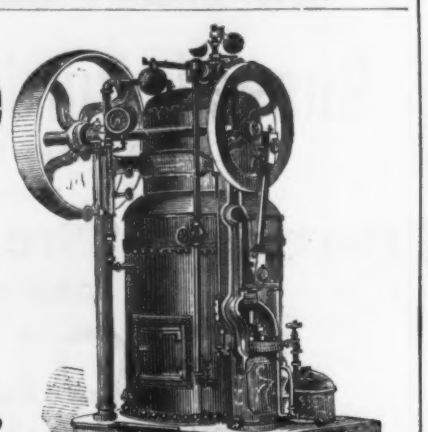

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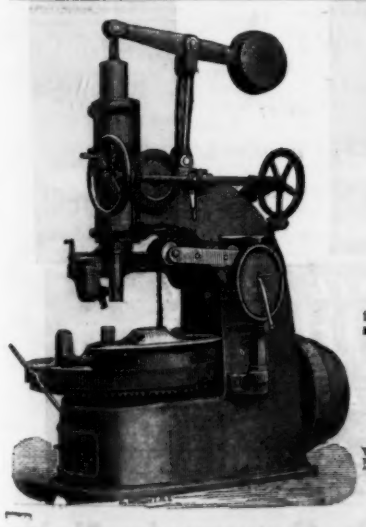

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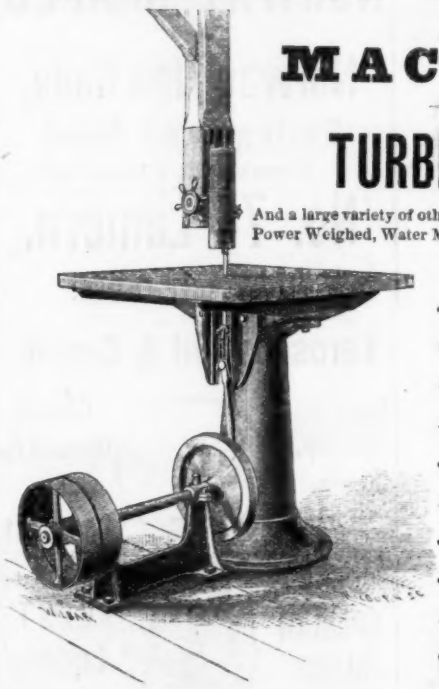

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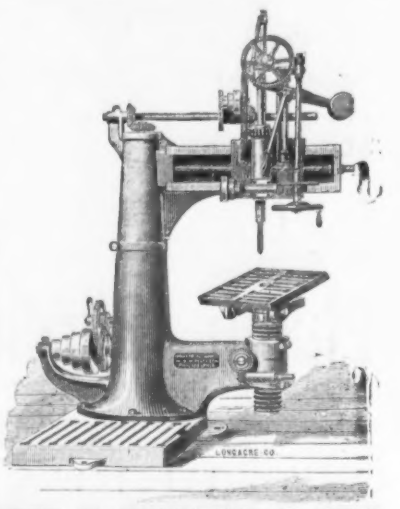

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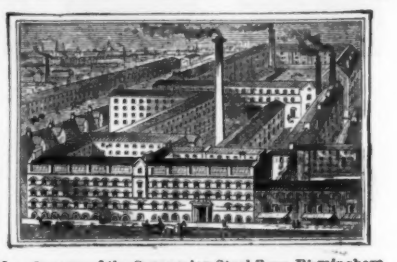

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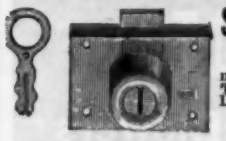

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